Leica RX1200
User Manual

Version 4.0
English

- when it has to be **right**

Leica
Geosystems

Introduction

Purchase Congratulations on the purchase of an RX1200.

This manual contains important safety directions as well as instructions for setting up the product and operating it. Refer to "7 Safety Directions" for further information. Read carefully through the User Manual before you switch on the product.

Product identification

The type and serial number of your product are indicated on the type plate. Enter the type and serial number in your manual and always refer to this information when you need to contact your agency or Leica Geosystems authorized service workshop.

Type: _____

Serial No.: _____

Symbols

The symbols used in this manual have the following meanings:

Type	Description
⚠ **Danger**	Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
⚠ **Warning**	Indicates a potentially hazardous situation or an unintended use which, if not avoided, could result in death or serious injury.
⚠ **Caution**	Indicates a potentially hazardous situation or an unintended use which, if not avoided, may result in minor or moderate injury and/or appreciable material, financial and environmental damage.
☞	Important paragraphs which must be adhered to in practice as they enable the product to be used in a technically correct and efficient manner.

Trademarks

- Windows and Windows CE are a registered trademark of Microsoft Corporation
- CompactFlash and CF are trademarks of SanDisk Corporation
- Bluetooth is a registered trademark of Bluetooth SIG, Inc

All other trademarks are the property of their respective owners.

Table of Contents

1 How to Use this Manual

☞ It is recommended to set-up the product while reading through this manual.

Path **Main Menu: Manage...\Data** stands for this working sequence:
From the **Main Menu** select **Manage...** and then select **Data**.

Screen **CONFIGURE General Menu** describes the name of the screen.

Page Screens can have more than one page. **Units** page describes a specific page of a screen. For example: '...in **CONFIGURE Units & Formats, Units** page...'

Fields and options Fields displayed on the screen are described as **<Coord System:>** or **<Coord System: Swiss>**, if 'Swiss' is the selected coordinate system.

XX The characters **XX** are used as place holders for screen names or multiple options that are all covered by a general description of appearance or functionality.

Example 1: **STAKEOUT XX Stakeout** indicates that the explanation provided is valid for the screens **STAKEOUT Polar Stakeout** and **STAKEOUT Orthogonal Stakeout**.

Example 2: In **REFLINE Define Reference**, **Reference** page, **<Task: XX Line>** indicates that the explanation provided is valid for the options **<Task: Measure to Line>**, **<Task: Stake to Line>** and **<Task: Gridstake Line>**.

Keys

Two different types of keys can be found on the instrument. These are fixed keys and softkeys.

Type	Description
Fixed keys	Keys which can be pressed on the keyboard, for example: • Function keys **F1-F6.** • Function keys **F7**-**F12.** • Alphanumeric keys. • **ESC**, **USER**, **PROG**, **CE**, **ENTER**, **SHIFT**. • Arrow keys.
Softkeys	Displayed on the screen, can be selected by using the assigned fixed key. For example **CONT (F1)**. The assigned fixed key is shown in brackets.

☞   Throughout the manual, stepwise instructions are used. Keys to be pressed within these instructions are indicated, such as **ENTER**, **CONT (F1)** or **SHIFT INDIV (F5)**.

Index   The index is at the end of the manual.

☞   Keys, fields and options on the screens which are considered as self-explanatory are not explained.

Validity of this manual
- This manual applies to all RX1200 instruments. Differences between the various models are marked and described.
- The RX1200 is available as RX1210 or with touch screen functionality as RX1210T, RX1220T, RX1250 X. The names RX1210 and RX1220 are used throughout the manual and may also represent the touch screen models. Only use the supplied stylus on the screens of the touch screen models.

Available documentation

General description

Name of documentation	Description
User Manual	All instructions required in order to operate the product to a basic level are contained in the User Manual. Provides an overview of the product together with technical data and safety directions.

Name of documentation	Description
System Field Manual	Describes the general working of the product in standard use. Intended as a quick reference field guide.
Applications Field Manual	Describes specific onboard application programs in standard use. Intended as a quick reference field guide. The RoadRunner application program is described in a separate manual.
Technical Reference Manual	Overall comprehensive guide to the product and program functions. Included are detailed descriptions of special software/hardware settings and software/hardware functions intended for technical specialists.

Available documentation depending on use case

Use case	User Manual	System Field Manual	Applications Field Manual	Technical Reference Manual
	for	for	for	for
TPS	TPS1200	TPS1200	TPS1200	TPS1200
TPS RCS	RX1200	TPS1200	TPS1200	TPS1200
GPS	GPS1200	GPS1200	GPS1200	GPS1200
GPS SmartRover	RX1200	GPS1200	GPS1200	GPS1200

Format of the documentation

The TPS1200 CD and GPS1200 CD contain the entire documentation in electronic format. The User Manual is available in printed form.

2 Description of the System

2.1 Terminology

Abbreviations

The following abbreviations may be found in this manual:

Term	Description
TPS	**T**otal Station **P**ositioning **S**ystem
GNSS	**G**lobal **N**avigation **S**atellite **S**ystem (generic term for satellite based navigation systems like GPS, GLONASS, SBAS)
RCS	**R**emote **C**ontrol **S**urveying
LGO	**L**EICA **G**eo **O**ffice

RX1200 controller

Description

Type	Description
RX1200	This is a collective term describing the various models of the multi-purpose controller.

Type	Description
	For TPS, a component of RCS is RX1200. TPS1200 instruments can be used with these controllers and radio modems (Radio-Handle or TCPS27) to form RCS.
	For GPS, these controllers can be used with GPS instruments. RX1250 can replace RX1210/RX1220 but not vice versa.

Available models

Models	Touch screen	Radio module	Internal battery	CompactFlash card	Bluetooth	Windows CE	Application	For GPS	For TPS
RX1210	-	-	-	-	-	-	GX1200		-
RX1210T	x	-	-	-	-	-	GX1200		-
RX1220T	x	x	x	-	-	-	GX1200		RCS
RX1250 X	x	-	x	x	x	x	SmartAntenna or GX1200		-

Holders   Two types of holders exist. The type of holder to be used depends on the RX1200 model.

Type	Description
GHT39	• To mount RX1200 on a GLS11 prism pole or on an antenna pole.
	• For TPS RCS and GPS applications.
	• Can be reversed so that it is mounted on the left hand side of the pole.
GHT56	• To mount RX1250 on an antenna pole or in combination with GHT57 on a tripod.
	• A clip-on-housing for a device can be attached. Refer to GPS1200 Technical Reference Manual for information on radios and digital cellular phones.
	• A GEB211 or GEB221 battery to power a device in a clip-on-housing can be attached.
	• For GPS applications.
	• Can be reversed so that it is mounted on the left hand side of the pole.

Radio modem   For TPS, a component of RCS is the radio modem, either RadioHandle or TCPS27.

Type	Description
RadioHandle	This is both an integrated radio modem with attached antenna and instrument carry handle.
TCPS27	Leica external radio modem with attached antenna.
TCPS27B	TCPS27 set to operate as a base radio.
TCPS27R	TCPS27 set to operate as a remote radio.

RCS accessories   For TPS, the following accessories for RCS can be stored in the transport container:

Type	Description
GRZ4 360° prism	Enables omnidirectional distance measurement to the target. Does not require to be aligned to the instrument for measurements to be made.
GRZ101 360° mini prism and GRZ101 adapter	Lighter smaller version of the GRZ4 360° prism. Can be mounted to a GLS11 prism pole retaining the correct height scale of the pole. This prism is not recommended for use with the PowerSearch function.
GEB171 external battery	This large Leica external battery enables continuous operation of both TPS1200 and TCPS27B for 18 h on a single charge.
GEB70 external battery	This small Leica external battery enables continuous operation of both TPS1200 and TCPS27B for 5 h on a single charge.
GEB211 internal battery	This Leica two cell Li-Ion internal battery enables working with RX1220 for 12 h on a single charge.

Type	Description
GHT39 pole holder	This unit enables RX1210 or RX1220T to be mounted on either the antenna pole or, with the use of the supplied sleeve, it can be mounted on the GLS11 prism pole. The GHT39 can be reversed so that it is mounted on the left hand side of the pole.
GHT43 tripod adapter	This adapter is intended for the mounting of TCPS27B to all Leica standard tripods in order to optimise the radio transmission performance. ☞ Scope of adjustability. The tripod adapter can be adjusted both up and down along the tripod leg, and the angle of TCPS27B can be adjusted to a vertical position.

LEICA Geo Office

Type	Description
LEICA Geo Office:	An office software consisting of a suite of standard and extended programs for the viewing, exchange and management of data.

2.2 System Concept

2.2.1 Software Concept

Description

The software concept depends on the RX1200 model.

The various types of software are explained in paragraph "Software type".

The software concept for the RX1200 models is explained in paragraph "Software concept".

Software type

Software type	Description
RX1200 software	For RX1210 and RX1220T. This software covers display, sound and communication settings of the RX1210 and RX1220T.
System software	This important software covers the basic functions of the instrument. System software is also referred to as firmware.
	The programs Survey and Setup are integrated into the firmware and cannot be deleted.
	The English language is integrated into the firmware and cannot be deleted.
Language software	Numerous languages are available for the receivers. Language software is also referred to as system language.

Software type	Description
	The system software enables a maximum of three languages which can be stored at any one time - the English language and two other languages. The English language is the default language and cannot be deleted. One language is chosen as the active language.
Application programs	A suite of optional survey-specific application programs are available for the instrument. Some of these programs are freely available and can be loaded and are immediately activated. The other programs must be purchased and are only activated with a licence key.
Customised application programs	Custom software specific to user requirements can be developed using the GeoC++ development kit. Information on the GeoC++ development environment is available on request from a Leica Geosystems representative.
SmartAntenna software	This is the software for the ATX1230/**ATX1230 GG**. It covers the firmware for the measurement engine.

Software concept

Type	Software type uploaded to	
	RX1200	**TPS instrument / GPS receiver**
RX1210/ RX1220	• RX1200 software	• System software • Language software • Application programs • Customised application programs
RX1250	• System software • Language software • Application programs • Customised application programs	-

Software upload

For RX1210 and RX1220

Firmware can be uploaded to RX1210 and RX1220 via LGO, TPS1200 or GPS1200.

IF the product being used is	THEN refer to
TPS1200	GPS1200 Technical Reference Manual.

IF the product being used is	THEN refer to
GPS1200	TPS1200 Technical Reference Manual.
LGO	online help in LGO.

For RX1250

All software is stored in the System RAM of the RX1250. The software can be uploaded onto a CompactFlash card in the RX1250 using the methods listed in the table below.

After uploading, the software must then be transferred from the CompactFlash card to the RX1250 System RAM. Refer to GPS1200 Technical Reference Manual for information.

From	To	Interface				Program	Refer to chapter
		USB	**Serial**	**Bluetooth**	**Card slot/ OMNI drive**		
PC	RX1250 CF card	x	x	x	-	LGO	online help in LGO
PC	RX1250 CF card	x	-	x	-	ActiveSync	
PC	CF card	-	-	-	x	-	

Microsoft ActiveSync is the synchronization software for Windows mobile-based pocket PC's. Microsoft ActiveSync enables a PC and a Windows mobile-based pocket PC to communicate.

For SmartAntenna

SmartAntenna must always be connected to RX1250 when uploading the firmware.
Connect SmartAntenna and RX1250 via cable.
Uploading the firmware takes some time.

2.2.2 Data Storage and Data Conversion Concept

☞   This chapter is valid for RX1250.

Description   Data is stored within a job in a database on a memory device. This is a Compact-Flash card.

Memory device   CompactFlash card: A CompactFlash card slot is standard. A CompactFlash card can be inserted and removed. Various capacities are available.

☞   Whilst other CompactFlash cards may be used, Leica recommends to only use Leica Compact-Flash cards and is not responsible for data loss or any other error that may occur whilst using a non-Leica card.

☞   Unplugging connecting cables or removing the CompactFlash card during the measurement may cause loss of data. Always return to **GPS1200 Main Menu** before removing the CompactFlash card and switch off the instrument before removing cables.

Data conversion

Export

Data can be exported from a job in a wide range of ASCII formats. The export format is defined in Format Manager which is a PC tool in LEICA Geo Office. Refer to the online help of LGO for information on creating format files.

Import

Data can be imported from ASCII, GSI8 or GSI16 format.

Transfer data

Data can be transferred in various ways. Refer to " ActiveSync" and the online help of LGO.

Data	From	To	Interface				Program
			USB	Serial	Bluetooth	Card slot/ OMNI drive	
Raw	RX1250 CF card	LGO	x	x	x	-	LGO
Raw	RX1250 CF card	PC	x	-	x	-	ActiveSync
Raw	CF card	LGO	-	-	-	x	LGO
Raw	CF card	PC	-	-	-	x	-
Job	LGO	RX1250 CF card	x	x	x	-	LGO

Data	From	To	Interface				Program
			USB	Serial	Bluetooth	Card slot/ OMNI drive	
Job	LGO	CF card	-	-	-	x	LGO
Job	PC	RX1250 CF card	x	-	x	-	ActiveSync
Job	PC	CF card	-	-	-	x	-
ASCII	PC	RX1250 CF card	x	x	x	-	LGO
ASCII	PC	RX1250 CF card	x	-	x	-	ActiveSync
ASCII	PC	CF card	-	-	-	x	-
ASCII	RX1250 CF card	PC	x	x	x	-	LGO
ASCII	RX1250 CF card	PC	x	-	x	-	ActiveSync
ASCII	CF card	PC	-	-	-	x	-

☞ CompactFlash cards can directly be used in an OMNI drive as supplied by Leica Geosystems. Other PC card drives may require an adaptor.

2.2.3   Power Concept

General   Use the Leica Geosystems batteries, chargers and accessories or accessories
                       recommended by Leica Geosystems to ensure the correct functionality of the instru-
                       ment.

Power options   **RX1200**

Model	Application	Power supply
RX1210	GPS	Via cable
		OR
		Via clip-on connector of the GPS receiver
	TPS RCS	Externally via cable
RX1220	GPS	Via cable
		OR
		Vial clip-on connector of the GPS receiver
	TPS RCS	Internally via GEB211 battery
RX1250	SmartRover	Internally via GEB211 battery
		OR

Model	Application	Power supply
		Externally via cable to battery.

SmartAntenna

Power for the antenna is supplied internally. One GEB211 battery fits into the antenna.
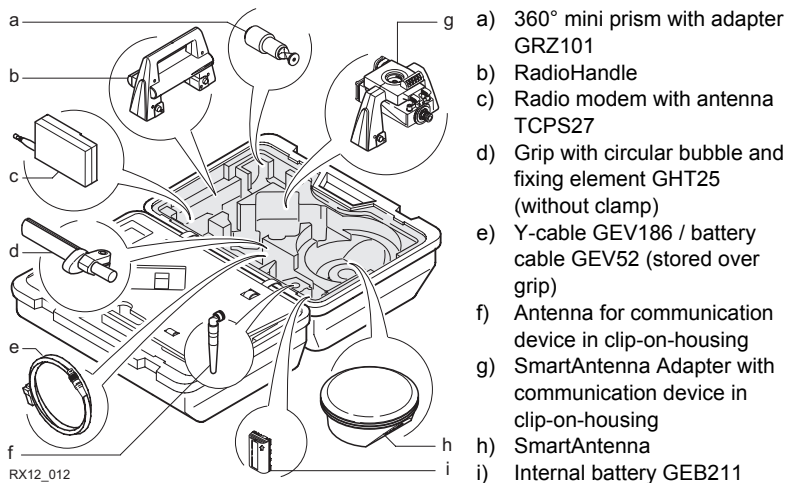
2.3 Transport Containers

### 2.3.1 Container Contents for the TPS Instrument

Description

Components for RCS and SmartStation are combined in one transport container.

Term	Description
SmartStation	A TPS1200 instrument integrated with an add-on GPS system, comprising hardware and software components, forms SmartStation.
	Components of SmartStation include SmartAntenna, SmartAntenna Adapter with attached clip-on-housing and antenna for a communication device and Communication side cover (not included in transport container).

Container for SmartStation/RCS components part 1 of 2

RX12_012

a) 360° mini prism with adapter GRZ101
b) RadioHandle
c) Radio modem with antenna TCPS27
d) Grip with circular bubble and fixing element GHT25 (without clamp)
e) Y-cable GEV186 / battery cable GEV52 (stored over grip)
f) Antenna for communication device in clip-on-housing
g) SmartAntenna Adapter with communication device in clip-on-housing
h) SmartAntenna
i) Internal battery GEB211

**Container for
SmartStation/RCS
components
part 2 of 2**
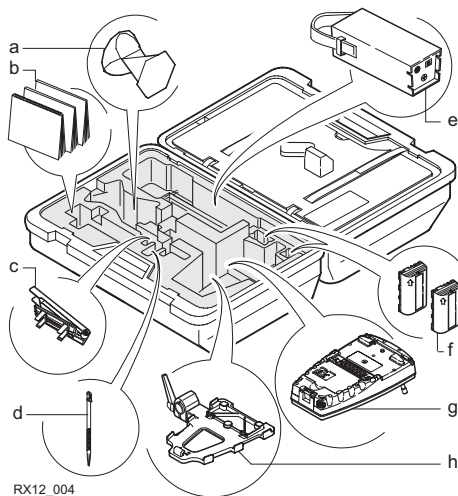
RX12_004

a) 360° prism GRZ4
b) User manual and other
    manuals
c) Tripod adapter for radio
    modem GHT43
d) Spare stylus
e) External battery - GEB70 or
    GEB171
f) 2 x internal batteries GEB211
g) RX1220 controller
    with stylus and antenna
h) Pole holder GHT39
    (with clamp) (stored under
    RX1220 controller)

## 2.3.2 Container Contents for the GNSS Receiver

Description

Components for a two component cableless GNSS real-time system are combined in one transport container.

Container for SmartRover part 1 of 2

GPS12_151a
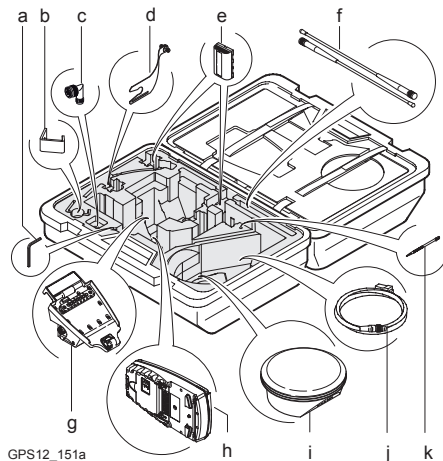
a) Adjusting pin
b) GHT57
c) 90° TNC conenctor
d) Arm 15 cm long, attaches to SmartAntenna
e) Spare batteries
f) Antennas of device
g) GHT56 with device, without battery
   OR
   SmartAntenna Adapter-without communication device in clip-on-housing
h) RX1250
i) SmartAntenna
j) Cables
k) Supplied stylus

**Container for
SmartRover
part 2 of 2**

GPS12_152
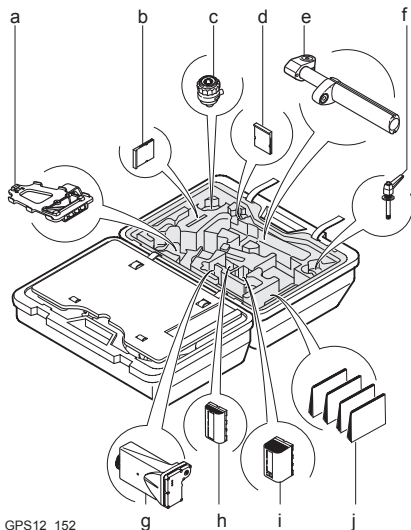
a) Pole holder GHT39
b) CompactFlash card adapter
c) Screw-to-stub adapter
d) CompactFlash card
e) Grip for pole
f) Screw to attach GHT39 and
   grip on pole
g) Device such as radio
h) Spare battery for SmartAn-
   tenna
i) Spare battery for GHT56
j) Manuals

2.4   RX1200 Components

**Upperside of
RX1200**

RX12_017
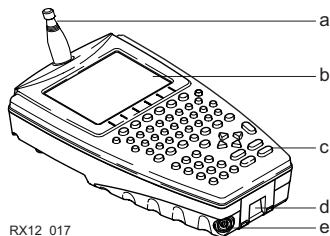
a) For RX1220: Radio antenna
b) Screen
c) Keyboard
d) Hand strap bottom clips
e) LEMO port
   For RX1250 including USB port

Underside of RX1200
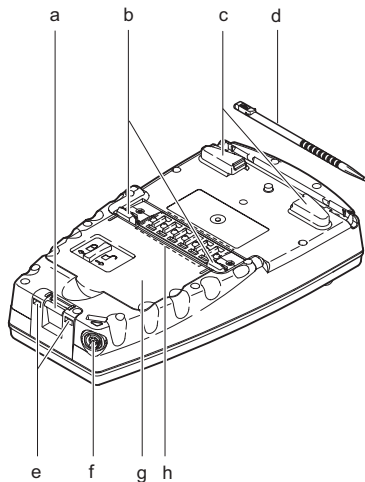
RX12_002

a) Bottom spring clip for pole holder
b) Top clips for pole holder
c) Hand strap top clips
d) Stylus
e) Hand strap bottom clips
f) LEMO port
   For RX1250 including USB port
g) Battery compartment
   For RX1250 with CompactFlash card compartment
h) Clip-on-contacts

For RX1250, a Bluetooth port is included inside to facilitate connectivity to the SmartAntenna, digital cellular phone or Leica Disto^{TM}.

3 User Interface

3.1 Keyboard

Keyboard display
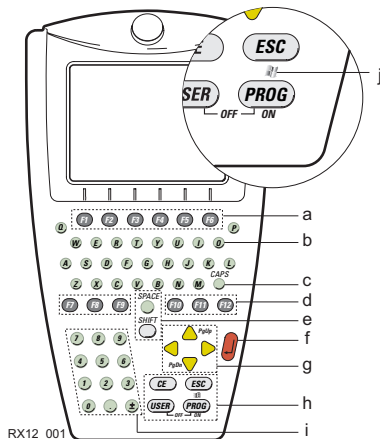
a) Function keys **F1**-**F6**
b) Alpha keys
c) **CAPS**
d) Hot keys **F7**-**F12**
e) **SPACE**, **SHIFT**
f) **ENTER**
g) Arrow keys
h) **CE**, **ESC**, **USER**, **PROG**
i) Numeric keys
j) For RX1250: Windows key symbol. It is the Microsoft flag logo located between **PROG** and **ESC**.

☞ For the purpose of the illustration, a RX1250 model has been selected which is representative for all models. Differences to other RX1200 models are outlined.

Keys

| Key	Function
Function keys **F1**-**F6**	Correspond to six softkeys that appear on the bottom of the screen when the screen is activated.
Hot keys **F7**-**F12**	User definable keys to execute chosen commands or access chosen screens.
Alpha keys	To type letters.
Numeric keys	To type numbers.
CAPS	Switches between upper case and lower case letters.
CE	• Clears all entry at the beginning of user input. • Clears the last character during user input.
ESC	• Leaves the current menu or dialogue without storing any changes made. • Turns receiver off when hold for 2 s in **GPS1200 Main Menu**.

Key	Function
PROG (**ON**)	• If the sensor is off: turn the sensor on.
	• If the sensor is on: press at any time to access **XX Programs** to select an application.
SHIFT	Switches between the first and the second level of function keys.
SPACE	Enters a blank.
USER	Calls the user defined menu. Hold down for 2 s to open **RX1200 Main Configuration Menu**.
Arrow keys	Move the focus on the screen.
ENTER	• Selects the highlighted line and leads to the next logical menu / dialog.
	• Starts the edit mode for edit fields.
	• Opens a choicelist.

Key combinations

Key	Function
PROG plus **USER**	• For RX1210/RX1220: Turns instrument off. • For RX1250: Puts RX1250 into sleep mode.
SHIFT 🔼	Pages up.
SHIFT 🔽	Pages down.
SHIFT PROG (🪟)	For RX1250: Displays either the Windows CE task bar and start menu.

3.2   Screen

Screen
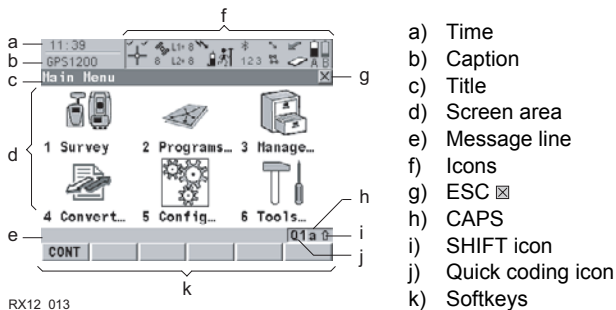
a) Time
b) Caption
c) Title
d) Screen area
e) Message line
f) Icons
g) ESC ⊠
h) CAPS
i) SHIFT icon
j) Quick coding icon
k) Softkeys

RX12_013

Elements

Type	Description
Time	The current local time is shown.
Caption	Shows location either in Main Menu, under **PROG** key or **USER** key.
Title	Name of the screen is shown.

Type	Description
Screen area	The working area of the screen.
Message line	Messages are shown for 10 s.
Icons	Shows current status information of the instrument. Can be used with touch screen to access the subsequent screen.
ESC ☒	Can be used with touch screen. Same functionality as the **ESC** fixed key. The last operation will be undone.
CAPS	The caps mode for upper case letters is active.The caps mode is activated and deactivated by pressing **UPPER (F5)** or **LOWER (F5)** in some screens.
SHIFT icon	Shows the status of the **SHIFT** key; either first or second level of softkeys is selected. Can be used with touch screen and has the same functionality as the fixed key **SHIFT**.
Quick coding icon	Shows the quick coding configuration. Can be used with touch screen to turn quick coding on and off.
Softkeys	Commands can be executed using **F1** - **F6** keys. The commands assigned to the softkeys are screen dependent. Can be used directly with touch screen.

3.3   Operating Principles

Keyboard and touch screen

The user interface is operated either by the keyboard or by the touch screen with supplied stylus. The workflow is the same for keyboard and touch screen entry, the only difference lies in the way information is selected and entered.

Operation by keyboard

Information is selected and entered using the keys. Refer to "3.1 Keyboard" for a detailed description of the keys on the keyboard and their function.

Operation by touch screen

Information is selected and entered on the screen using the supplied stylus.

Operation	Description
To select an item	Tap on the item.
To start the edit mode in input fields	Tap on the input field.
To highlight an item or parts of it for editing	Drag the supplied stylus from the left to the right.
To accept data entered into an input field and exit the edit mode	Tap on the screen outside of the input field.

3.4 Icons

Description
The icons described are specific to RCS and RX1250.
For a complete listing of icons
- for GPS1200 refer to GPS1200 System Field Manual.
- for TPS1200 refer to TPS1200 System Field Manual.

RCS icons
For TPS, RCS settings are displayed.
Touch screen: Tapping the icon leads to **CONFIGURE Interfaces**.

Icon	Description
	The RCS is turned on.
	The RCS is within radio range and is receiving messages.

Bluetooth icons The status of each Bluetooth port and any Bluetooth connection is displayed.
Touch screen: Tapping the icon leads to **STATUS Bluetooth**.

Icon	Description
	RX1250, GNSS receiver with GFU16 or TPS instrument with Communication side cover is Bluetooth capable. In case of a RX1250, Bluetooth is integrated.
	A Bluetooth connection is established and active.
123	Bluetooth connection not established. Bluetooth port 1, 2 and 3 are down. Port 2 and 3 are only available on RX1250.
123	Bluetooth connection established. Bluetooth port 1, 2 and 3 are active. Port 2 and 3 are only available on RX1250.

Battery icons   The status and source of the battery is displayed. The remaining power in the battery is indicated by six levels.

For RX1250: If an external power supply is connected and one internal battery is inserted, then the external power is used.

Touch screen: Tapping the icon leads to **STATUS Battery & Memory, Battery** page.

Icon	Description
	For RX1250: Internal battery is in use.
	For RX1250: External battery attached and in use.
	For TPS1200 instruments: Internal TPS and RCS batteries are in use.
	For TPS1200 instruments: External TPS and RCS batteries are in use.

4 Operation

4.1 Equipment Setup

4.1.1 Fixing RX1200 to a Holder, Handstrap or GNSS Receiver

Description   RX1200 can be set up using
- a holder on the pole.
- GNSS receiver.
- a handstrap.

All three setups are described in this chapter.

Holders

Components of the GHT39

The GHT39 consists of a number of components, as shown in the diagram below.

RX12_005

a) Plastic sleeve
b) Pole clamp
c) Clamp bolt
d) Tightening screw
e) Mounting plate
f) Mounting arm
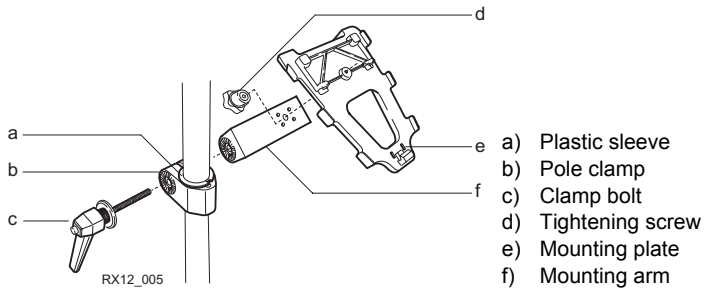
Components of the GHT56
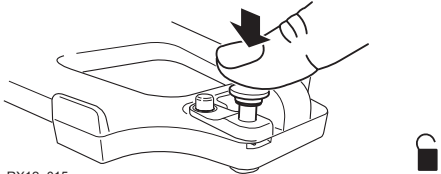
The GHT56 consists of a number of components, as shown in the diagram below.

a) Plastic sleeve
b) Pole clamp
c) Clamp bolt
d) Tightening screw
e) Mounting arm
f) Clip-on-contacts for connecting RX1250
g) LED
h) Mounting plate
i) Battery compartment
j) Locking mechanism for battery
k) Space for clip-on-housing with LEMO port
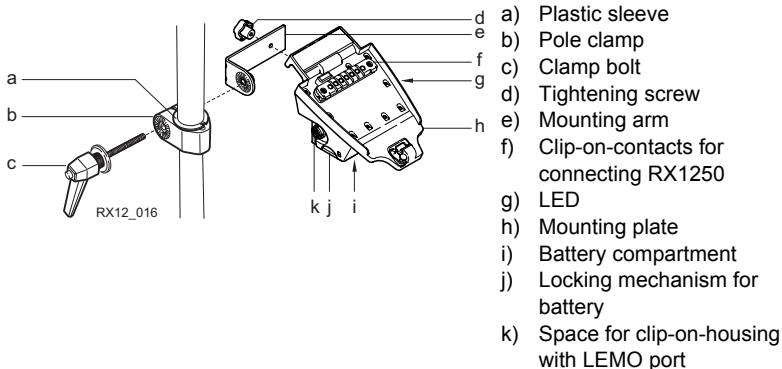
Mount RX1200 to pole step-by-step

Using the GHT39 is explained in this step-by-step instruction. Using GHT56 works accordingly.

Step	Description
1.	Remove holder from the travel container.
2.	For GLS11 pole: the plastic sleeve is to be fitted to the pole clamp. For GPS pole: the plastic sleeve is not required.
3.	Insert pole into the clamp hole.
4.	Adjust the angle of the mounting plate and the height of the holder on the pole to comfort.
5.	Tighten the clamp with the tightening screw.
☞	Once tightened, the button on the tightening screw can be depressed to change the position of the handle for more comfort.
☞	A locking mechanism is incorporated in the mounting plate of the holder.
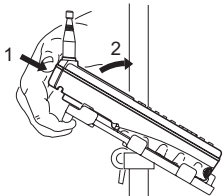
Step	Description
6.	Before RX1200 is placed onto the mounting plate ensure that the locking pin is put into the unlocked position. To unlock the locking pin, push down the red button situated on top of the mounting plate.

RX12_015

| 7. | Hold RX1200 above the holder and lower the end into the holder. |

Step	Description
8.	Apply slight pressure in a downward direction and then lower the top part of RX1200 until the unit is clicked into the holder. The guides of the holder aid in this action. RX12_006
9.	After RX1200 is placed onto the mounting plate ensure that the locking pin is put into the locked position. To lock the locking pin, push up the red button from below. RX12_014

Detach RX1200 from pole step-by-step

Using the GHT39 is explained in this step-by-step instruction. Using GHT56 works accordingly.
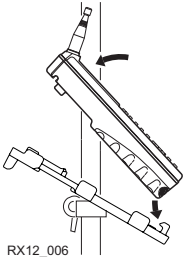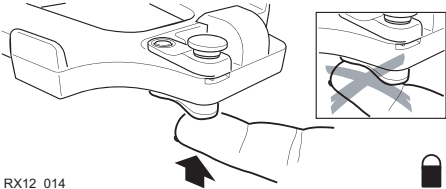
Step	Description
1.	Unlock the locking pin by pushing down the red button situated on top of the mounting plate.
2.	Place the palm over the top of RX1200 until the fingers grip the bar of the holder under the top of RX1200.
3.	Compress the top of RX1200 toward the bar of the holder.
4.	While in this position, raise the top of RX1200 where the palm is gripping the unit up from the holder. RX12_007
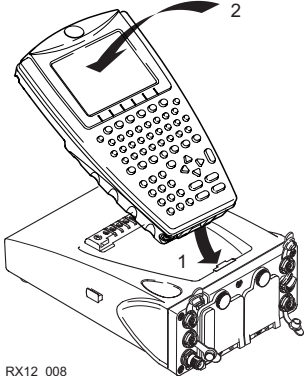
GPS receiver
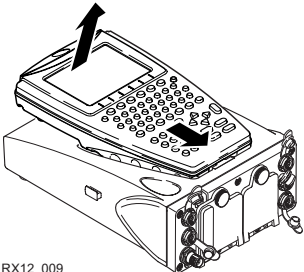
Description

RX1210, RX1220 and RX1250 can be mounted to a GNSS receiver.

Mount RX1210/RX1220/RX1250 to GNSS receiver step-by-step
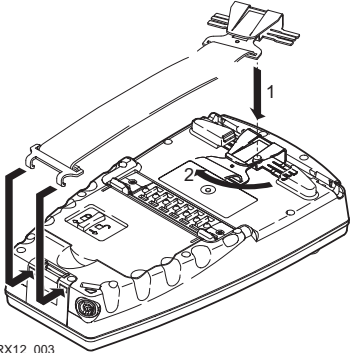
Step	Description	
1.	Hold RX1200 above the recess in the housing of the GNSS receiver intended for the unit.	
2.	Lower the bottom part of RX1200 into the recess in the housing of the GNSS receiver.	
3.	Apply slight pressure in a downward direction and then lower the top part of RX1200 until the unit is clicked into the GNSS receiver. The recess in the housing of the GNSS receiver helps to guide RX1200.	RX12_008

Detach RX1210/RX1220T from GNSS receiver step-by-step

Step	Description
1.	Place the palm over the top of RX1200.
2.	Compress RX1200 downward toward the ports of the GNSS receiver.
3.	While in this position, raise the top of RX1200 from the GNSS receiver.

RX12_009

Handstrap

Mount handstrap to RX1200 step-by-step

Step	Description
☞	 RX12_003
1.	Hold the main hook rotated to approximately the 11 o'clock position in relation to RX1200.
2.	Lower the main hook onto the pivot knob in the middle of RX1200.
3.	Rotate the main hook to the 12 o'clock position. A click should be felt when the clip is secure.

Step	Description
4.	Take the other end of the handstrap and clip it to the base of RX1200.
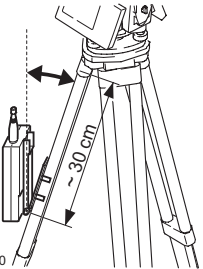
4.1.2 Setting up with the TPS Instrument

TPS1200/RX1200 setup for RCS with RadioHandle

Refer to "TPS1200 User Manual" for additional information on RadioHandle.

a) 360° prism
b) Prism pole
c) RX1220
d) RX1200 holder and pole clamp
e) RadioHandle
f) Communication side cover
g) TPS1200 instrument
h) Tripod

RX12_013
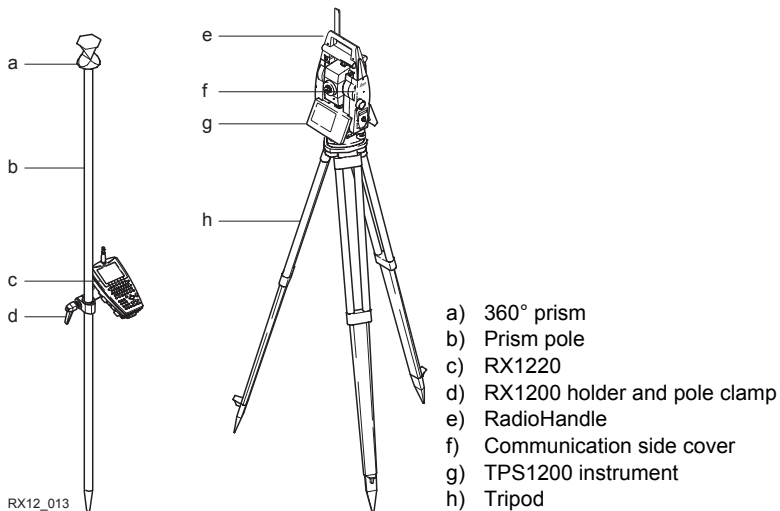
Mount base radio to tripod step-by-step

Step	Description
1.	Attach TCPS27B to the adapter and then attach to the tripod leg.
2.	Adjust the angle of TCPS27B until it is approximately vertical.
3.	Adjust the location of the adapter on the tripod leg so that there are no metallic objects in the horizontal plane around the antenna. ☞ Metallic objects near the antenna disturb transmissions from the radio.
☞	To achieve the best performance from TCPS27B, it should be mounted in a vertical position on the tripod leg approximately 30 cm from the top of the tripod. RX12_010
☞	If the adapter is no longer able to retain it's angle position, the adjustment bolt at the hinge can be slightly tightened.

TPS1200/RX1200 setup for RCS with TCPS27

RX12_011

a) 360° prism
b) Prism pole
c) RX1220
d) RX1200 holder and pole clamp
e) TPS1200 instrument
f) Tripod
g) TCPS27B
h) External battery
i) Y-cable
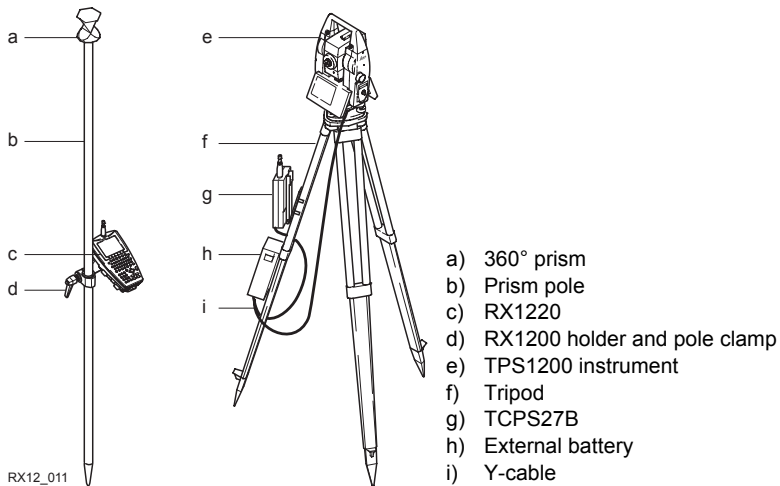
4.1.3 Setting up with the GNSS Receiver

Description Two setups for RX1250 are given as example. Refer to "GPS1200 Technical Reference Manual" for information on additional setups.

**SmartAntenna/
RX1250 X setup for
real-time reference**

RX12_28

a) SmartAntenna
b) Battery for SmartAntenna
c) Height hook
d) Carrier
e) Tribrach
f) Tripod
g) GHT57
h) GHT56
i) Radio housing
j) Transport container
k) RX1250 X
l) Radio antenna
m) Battery for RX1250 X
n) CompactFlash card
o) Battery for GHT56
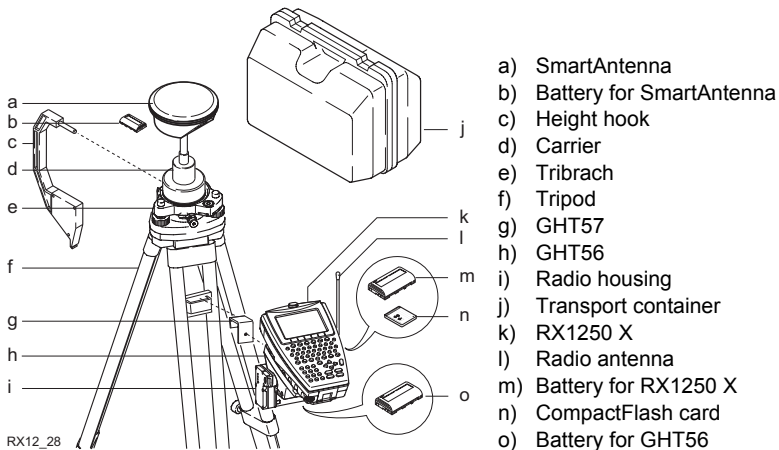
SmartRover setup with external radio

RX12_31

a) SmartAntenna
b) Battery for SmartAntenna
c) Upper half aluminium pole with screw or stub
d) Grip for pole
e) GHT56
f) Radio in housing
g) Lower half aluminium pole
h) Radio antenna
i) Battery for RX1250 X
j) CompactFlash card
k) RX1250 X
l) Battery for GHT56
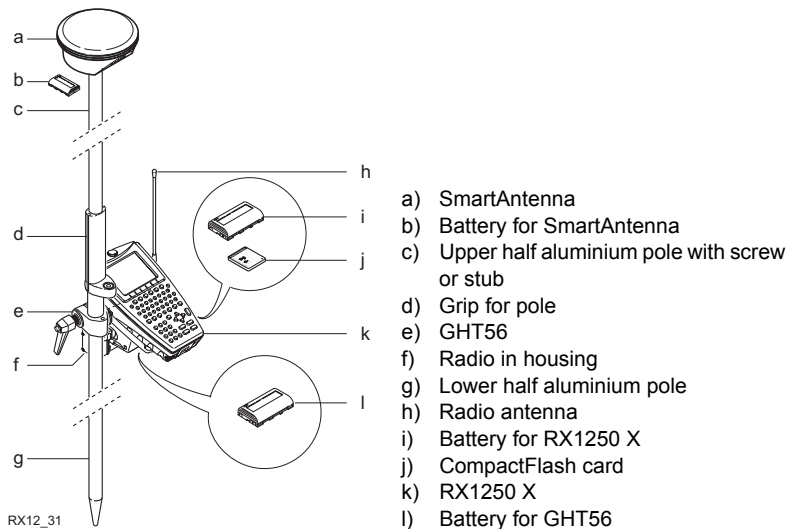
Increase radio coverage on Smart-Rover

Description

Some applications require the maximum radio coverage. In those cases the radio antenna is mounted on an antenna arm which is fixed to the pole just below the SmartAntenna. Connection is made between the radio housing and the radio antenna.

Connect radio antenna and radio housing using cable step-by-step

Step	Description
1.	Clip the antenna arm to the SmartAntenna.
2.	Screw the radio antenna onto the antenna arm.
3.	Attach the radio in its housing to GHT56.
4.	Place the battery into the battery compartment of the GHT56.
5.	Attach GHT56 to the pole and tighten the screw.
6.	Connect the radio antenna to the radio housing using the 1.2 m antenna cable.

4.2 Batteries

4.2.1 Operating Principles

☞ This chapter is valid for RX1220, RX1250 and GHT56.

☞ **Primary use/charging**

• The battery must be charged prior to using it for the first time because it is delivered with an energy content as low as possible.

• For new batteries or batteries that have been stored for a long time (> three months), it is effectual to make only one charge/discharge cycle.

• For Li-Ion batteries, a single discharging and charging cycle is sufficient. We recommend carrying out the process when the battery capacity indicated on the charger or on a Leica Geosystems product deviates significantly from the actual battery capacity available.

• The permissible temperature range for charging is between 0°C to +40°C/ +32°F to +104°F. For optimal charging we recommend charging the batteries at a low ambient temperature of +10°C to +20°C/+50°F to +68°F if possible.

• It is normal for the battery to become warm during charging. Using the chargers recommended by Leica Geosystems, it is not possible to charge the battery if the temperature is too high.

Operation/Discharging

• The batteries can be operated from -20°C to +55°C/-4°F to +131°F.

• Low operating temperatures reduce the capacity that can be drawn; very high operating temperatures reduce the service life of the battery.

4.2.2 RX1220/RX1250 Battery

Change RX1220/RX1250 battery step-by-step
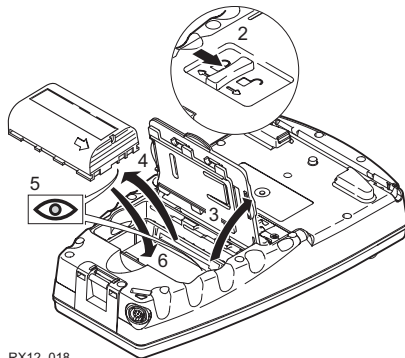
RX12_018

Step	Description
1.	Turn RX1220/RX1250 over to gain access to the battery compartment.
2.	Push the slide fastener in the direction of the arrow with the open-lock symbol.

Step	Description
3.	Open the battery compartment.
4.	Pull the battery from the battery compartment.
5.	A pictogram of the battery is displayed inside the battery compartment. This is a visual aid to assist in placing the battery correctly.
6.	Place the battery into the battery compartment with the Leica logo facing to the left.
7.	Close the battery compartment by pushing the slide fastener in the direction of the arrow with the close-lock symbol.

4.2.3   SmartAntenna Battery

Change SmartAntenna battery step-by-step
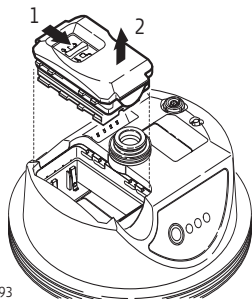
TPS12_193
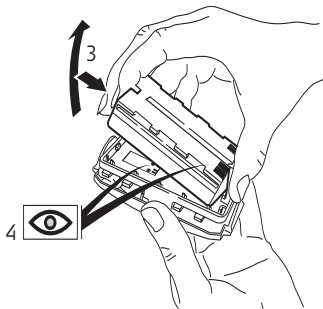
Step	Description
☞	Turn the SmartAntenna over to gain access to the battery compartment.
1.	Open the battery compartment by pushing the slide fastener in the direction of the arrow with the open-lock symbol.
2.	Pull out the battery housing. The battery is attached to the housing.
3.	Hold the battery housing and pull the battery from the battery housing.

Step	Description
4.	A polarity of the battery is displayed inside the battery housing. This is a visual aid to assist in placing the battery correctly.
5.	Place the battery onto the battery housing, ensuring that the contacts are facing outward. Click the battery into position.
6.	Close the battery compartment by pushing the slide fastener in the direction of the arrow with the close-lock symbol.

4.2.4 GHT56 Battery

Description

GEB211 and GEB221 can both be used with GHT56. The battery powers a device in a clip-on-housing attached to the GHT56.

Change GHT56 battery step-by-step
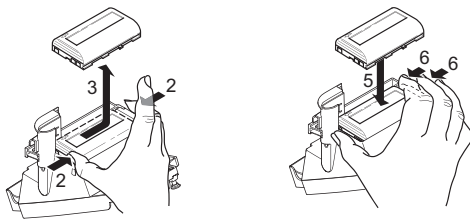
RX12_022

Step	Description
1.	Turn GHT56 over to gain access to the battery compartment.
2.	Press simultaneously on the right side of the locking mechanism and the left side of the battery.
👉	This unlocks the battery from its locked position.
3.	Pull the battery from the battery compartment.

Step	Description
4.	Place the battery into the battery compartment.
☞	Ensure that the battery is placed adjacent to the locking mechanisam with the contacts facing down.
5.	Press simultaneously on the right side of the locking mechanism and the right side of the battery.
☞	This locks the battery into position.

4.3   Working with the CompactFlash Card

This chapter is valid for RX1250.

• Keep the card dry.
• Use it only within the specified temperature range.
• Do not bend the card.
• Protect the card from direct impacts.

Failure to follow these instructions could result in data loss and/or permanent damage to the card.

Insert and remove a CompactFlash card step-by-step

The CompactFlash card is inserted into a slot inside the battery compartment on the underside of the RX1250.
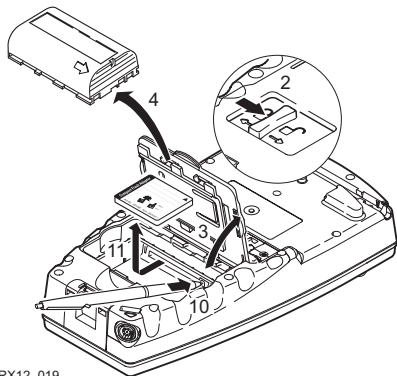
RX12_019

Step	Description
1.	Turn RX1250 over to gain access to the battery compartment.

Step	Description
2.	Push the slide fastener in the direction of the arrow with the open-lock symbol.
3.	Open the battery compartment.
4.	Pull the battery from the battery compartment.
☞	The card should be held with the label for the care instructions upwards and the contacts facing the slot.
5.	Slide the card firmly into the slot until it clicks into position.
6.	Place the battery into the battery compartment.
7.	Close the compartment cover.
8.	To remove the card, open the cover of the battery compartment.
9.	Pull the battery from the battery compartment.
10.	Press the eject button on the right side of the card slot twice.
11.	Pull out the CompactFlash card.
12.	Close the compartment cover.

Format a Compact-Flash card step-by-step

Formatting the CompactFlash card before logging data is started is required if a completely new CompactFlash card is used or if all existing data needs to be deleted.

Step	Description
1.	Select **Main Menu: Tools...\Format Memory Device**.
2.	**TOOLS Format Memory Device**
	<Memory Device: CF Card>
	<Format Method: Format Quick>
	Select the memory device to be formatted.
☞	By activating the format command all data will be lost. Make sure that all important data on the CompactFlash card has been backed up before formatting the card. Before formatting the internal memory make sure that all important data is first transferred to the PC.
☞	To exit the screen without formatting the memory device, press **ESC**. This returns to the previous screen.
3.	**CONT (F1)**
4.	**YES (F4)** to continue with the formatting of the selected device.

Step	Description
☞	**NO (F6)** to not continue with the formatting of the selected device and to return to **TOOLS Format Memory Device**.
5.	Once the formatting of the card is completed the system returns to **GPS1200 Main Menu**.

4.4 LED Indicators on SmartAntenna

LED indicators

Description

SmartAntenna has **L**ight **E**mitting **D**iode indicators. They indicate the basic antenna status.

Diagram

GPS12_153
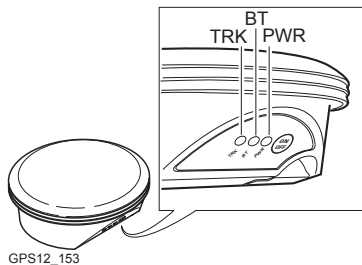
TRK	Tracking LED
BT	Bluetooth LED
PWR	Power LED

Description of the LED's

IF the	is	THEN
TRK	off	no satellites are tracked.
	flashing green	less than four satellites are tracked, a position is not yet available.
	green	enough satellites are tracked to compute a position.
BT	green	Bluetooth is in data mode and ready for connecting.
	purple	Bluetooth is connecting.
	blue	Bluetooth has connected.
	flashing blue	data is being transferred
PWR	off	power is off.
	green	power is okay.
	flashing green	power is low. The remaining time for which enough power is available depends on the type of survey, the temperature and the age of the battery.
	red	power is very low.

4.5 LED Indicators on GHT56

LED indicator
Description
GHT56 has one **L**ight **E**mitting **D**iode indicator. It indicates the basic power status.

Diagram

RX12_021
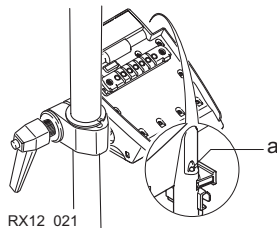
a) Power LED

Description of the LED

IF the	is	THEN
PWR	off	power is off.
	green	power is okay.
	flashing green	power is low. The remaining time for which enough power is available depends on the type of survey, the temperature and the age of the battery.
	red	power is very low.

4.6   Working with the Clip-On-Housings for Devices on GHT56

Devices fitting into a clip-on-housing

Digital cellular phones fitting into a clip-on-housing

Digital cellular phone	Clip-on-housing
Siemens MC45	GFU17
Siemens MC75	GFU24
CDMA MultiTech MTMMC-C (US)	GFU19
CDMA MultiTech MTMMC-C (CAN)	GFU25

Radios fitting into a clip-on-housing

Radio	Clip-on-housing
Pacific Crest PDL, receive	GFU15
Satelline 3AS, transceive	GFU14

Attach a clip-on-housing step-by-step

The clip-on-housing for devices fits to the underside of the GHT56.
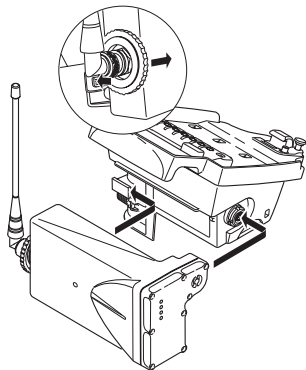
RX12_020

Step	Description
☞	A circular screw is located at one end of the clip-on-housing. Ensure that the circular screw is in the unlocked position. Turn it anticlockwise, as shown by the lock and arrow symbols on the screw.

Step	Description
1.	Turn GHT56 over to gain access to the space for the clip-on-housing.
2.	Place the clip-on-housing into position such that • the guide rails on the GHT56 are aligned with the guide rails on the clip-on-housing. AND • the LEMO port on the GHT56 is aligned with the connector on the clip-on-housing.
3.	Slide the clip-on-housing into position such that the connector is completely plugged into the LEMO port. It clicks.
☞	Do not turn the screw on the topside of the clip-on-housing. The clip-on-housing is automatically fixed when completely plugged into position.

Detach a clip-on-housing step-by-step

Step	Description
1.	Press the small press clip next to the guide rail on the GHT56 to unlock the clip-on-housing from the GHT56.
2.	Slide the clip-on-housing away from the press clip until the connector is completely unplugged from the LEMO port.

Step	Description
3.	Pull the clip-on-housing from the GHT56.

Insert a SIM card step-by-step

For those digital cellular phones that require SIM cards.

Step	Description
1.	Take the SIM card, a coin and a pen.
2.	Locate the SIM card screw, that covers the SIM card slot, on the bottom of the clip-on-housing.
3.	Insert the coin into the groove of the SIM card screw.
4.	Turn the coin anticlockwise to loosen the SIM card screw.
5.	Remove the SIM card screw from the housing.
6.	Using the pen, press the small button of the SIM card slot to eject the SIM card holder.
7.	Take the SIM card holder out off the housing.
8.	Put the SIM card into the SIM card holder, the chip facing up.
9.	Insert the SIM card holder into the SIM card slot, the chip facing the connectors inside the slot.

Step	Description
10.	Place the SIM card screw back on the housing.
11.	Insert the coin into the groove of the SIM card screw.
12.	Turn the coin clockwise to tighten the SIM card screw.

Remove a SIM card step-by-step

For those digital cellular phones that require SIM cards.

GPS12_088
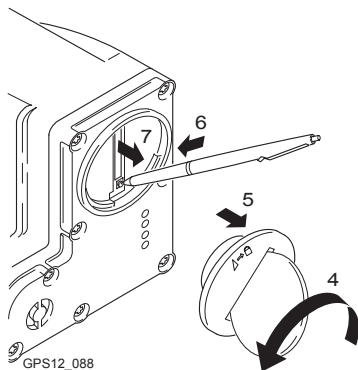
Step	Description
1.	Take a coin and a pen.
2.	Locate the SIM card screw, that covers the SIM card slot, on the bottom of the clip-on-housing.
3.	Insert the coin into the groove of the SIM card screw.

Step	Description
4.	Turn the coin anticlockwise to loosen the SIM card screw.
5.	Remove the SIM card screw from the housing.
6.	Using the pen, press the small button of the SIM card slot to eject the SIM card holder.
7.	Take the SIM card holder out off the SIM card slot.
8.	Take the SIM card out of the SIM card holder.
9.	Put the SIM card holder back into the SIM card slot, the even side not facing the contacts inside the slot.
10.	Place the SIM card screw back on the housing.
11.	Turn the coin clockwise to tighten the SIM card screw.

LED indicators   **Description**

Each clip-on-housing for a radio, digital cellular phones or Bluetooth communication has **L**ight **E**mitting **D**iode indicators on the bottom side. They indicate the basic device status.

Diagram

GPS12_089
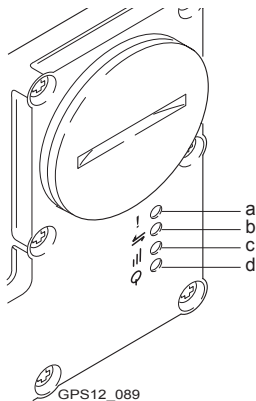
a) Warning LED, available for Satelline 3AS
b) Data transfer LED
c) Signal strength LED or Status LED for Bluetooth communication
d) Power LED

Description of the LED's

IF the	on	is	THEN
Warning LED	GFU14 with Satelline 3AS	red	the device is in the configuration mode controlled from the PC via cable.
Data transfer LED	any device	off	data is not being transferred.
		green or flashing green	data is being transferred.

IF the	on	is	THEN
Signal strength LED	GFU19 (US), GFU25 (CAN) with CDMA MultiTech MTMMC-C	red	device is on, not registered on the network.
		flashing red	device is on, registered on the network.
		off	download mode or device is off.
	GFU17 with Siemens MC45	red	call is in progress.
		red: long flash, short break	no SIM card inserted, no PIN entered or network search, user authentication or network login in progress.
		red: short flash, long break	logged onto network, no call in progress.
		off	device is off.

IF the	on	is	THEN
	GFU24 with Siemens MC75	red	call is in progress.
		red: long flash, long break	no SIM card inserted, no PIN entered or network search, user authentication or network login in progress.
		red: short flash, long break	logged onto network, no call in progress.
		red: flashing red, long break	GPRS PDP context activated.
		red: long flash, short break	Packet switched data transfer is in progress.
		off	device is off.
	GFU15 with Pacific Crest PDL	red or flashing red	the communication link, **D**ata **C**arrier **D**etection, is okay on the roving receiver.
		off	the DCD is not okay.

IF the	on	is	THEN
	GFU14 with Satelline 3AS	red or flashing red	the communication link, **D**ata **C**arrier **D**etection, is okay on the roving receiver.
		off	the DCD is not okay.
Status LED	Bluetooth communication	green	Bluetooth is in stand-by mode.
		orange	Bluetooth is in configuration mode.
		purple	Bluetooth is connecting.
		blue	Bluetooth has connected.
Power LED	any device	off	power is off.
		green	power is okay.

4.7 Basic Operation

Turning RX1200 on

Type	Description
PROG (**ON**)	When RX1200 has a power supply, pressing **PROG** (**ON**) on RX1200 unit switches the unit on.
Connection to the LEMO port	When RX1200 is connected via cable to either TPS1200 or GPS1200 that are already switched on, RX1200 automatically switches on.
	☞ RX1200 has to be connected to a power source to switch on automatically. This can be either an external battery connected with a Y-cable, power received from GPS1200 or an internal battery for RX1220/RX1250.
Connection to the clip-on connector	When RX1200 is connected to the clip-on connector of GPS1200 that is already on, RX1200 automatically switches on.

When RX1200 has been turned on

Type	Description
Connected to GPS1200	• When RX1200 is operating with the GPS1200, RX1200 acts as the control unit of the GPS1200.
Direct connection to TPS1200	• When RX1200 is connected directly to TPS1200 with a cable, RX1200 acts as a secondary control unit for TPS1200 which additionally offers dedicated alpha keyboard and touch screen capabilities.
Radio connection to TPS1200	• When RX1220 is connected to TPS1200 via the radio link, RX1220 acts as a remote control system enabling operation of TPS1200 from the prism pole.
Operating without an instrument	• When RX1210/RX1220 is activated without a connection to either TPS1200 or GPS1200, it will enter the local mode. • When RX1250 is activated without a connection to SmartAntenna or GPS1200, survey independent tasks such as COGO can still be performed.

Turning RX1200 off

Type	Description
OFF	The RX1200 can only be turned off in the **Main Menu** screen.
	• For RX1210/RX1220: Pressing the **USER** and **PROG** keys simultaneously will switch off RX1200. OR Hold **ESC** for 2 s.
	• For RX1250: **SHIFT OFF (F2)** to completely turn off.
Unplugging or unclipping from the instrument	Disconnecting either the LEMO cable or the clip-on connector of RX1200 without an internal battery automatically switches it off.
Auto power down	Option to set shutdown and sleep events after user defined duration of instrument inactivity when working with TPS instruments.

Sleep mode on RX1250

Description

In sleep mode, the RX1250 shuts down and reduces power. The sleep mode is designed to preserve energy. Rebooting RX1250 from sleep mode is quicker than a cold start after turning off.

Putting RX1250 into sleep mode

The RX1250 can only be put into sleep mode in the **Main Menu** screen.

Press the **USER** and **PROG** keys simultaneously.

OR

Press **SHIFT SLEEP (F3)**.

OR

Hold **ESC** for 2 s.

Lock/Unlock keyboard

Option	Description
Lock	To lock the keyboard press and hold **SHIFT** for 3 s. The message 'Keyboard locked' is momentariliy displayed on the Message Line.
Unlock	To unlock the keyboard press and hold **SHIFT** for 3 s. The message 'Keyboard unlocked' is momentariliy displayed on the Message Line.

**Switching between
Leica software and
Windows CE
desktop**

SmartRover
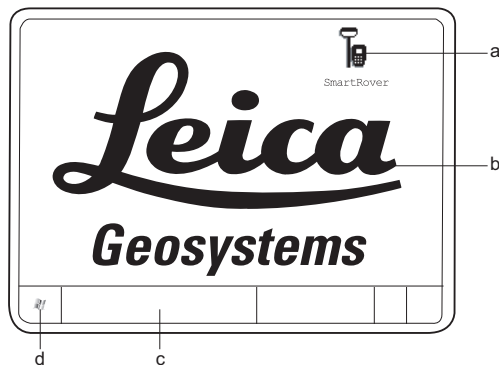
RX12_33

a) Icon to start Leica
   software
b) Windows CE desktop
c) Task bar
d) Start button

Access Leica software

IF	THEN
RX1250 is started	the Leica software starts up automatically.

IF	THEN
Windows CE desktop is active	double click 📱 to display the Leica software. OR **SHIFT PROG** (⚡) to display the Leica software.
Leica software is minimised	double click 📱 to maximise it. OR select SmartRover in the task bar to maximise it.

Access Windows CE desktop

IF	THEN
Leica software is to be minimised	**SHIFT MINIM (F5)** in **Main Menu**.
Leica software is to be closed	**SHIFT EXIT (F6)** in **Main Menu**.
Windows CE task bar is to be displayed	**SHIFT PROG** (⚡).

4.8   Licence Keys

Description

A licence key can be used to activate application programs and protected options and can be used to define the expiry date of the software maintenance.
A licence key is required for:

Application programs	Protected options
• COGO Area Division	• GPS Survey functionality on RX1250
• DTM Stakeout	• Some OWI messages
• Reference Plane	• GLONASS option
• Reference Line	
• RoadRunner	
• Survey Cross Section	
• Volume Calculations	

A licence key file can be uploaded to the receiver/RX1250. To upload a licence key file the file should be located on the \SYSTEM directory of the CompactFlash card. Licence key files use the naming convention L_123456.key, where 123456 is the instrument serial number.

Licence keys can also be typed in manually in **Main Menu: Tools...\Licence Keys** or the first time the application program is started.

Access

Select **Main Menu: Tools...\Licence Keys**.

OR

Select an application program on RX1250 not yet activated.

TOOLS Enter Licence Key

```
 11:40      + ⊕ IR  I  📱  * ⤢ 🔋▯
 TOOLS         STD
Enter Licence Key                    ✕

Method   :   Manual Entry of Key ◀▶
Key      :         4h16f9phweowrb




                                    Q2a⇧
 CONT  |      |      |      |      |
```

CONT (F1)
To accept changes and return to **GPS1200** Main Menu or continue with application program.

SHIFT DEL (F4)
To delete all licence keys on the receiver/RX1250.

Description of fields

Field	Option	Description
<Method:>		The method used to input the licence key to activate the application program or the protected options or the software maintenance.
	Upload Key File	The licence key file is uploaded from the CompactFlash card. The licence key file must be stored in the \SYSTEM directory on the CompactFlash card.
	Manual Entry of Key	Allows the licence key to be typed in manually.
<Key:>	User input	Available for **<Method: Manual Entry of Key>**. The licence key required to activate an application program. Entry is not case sensitive.

Next step
CONT (F1) returns to **GPS1200 Main Menu** or continues with selected application program.

4.9 Guidelines for Correct Results with GNSS Surveys

Undisturbed satellite signal reception

Successful GNSS surveys require undisturbed satellite signal reception, especially at the receiver which serves as a reference. Set up the receivers in locations which are free of obstructions such as trees, buildings or mountains.

Steady antenna for static surveys

For static surveys, the antenna must be kept perfectly steady throughout the whole occupation of a point. Put the antenna on a tripod or pillar.

Centred and levelled antenna

Centre and level the antenna precisely over the marker.

4.10 RX1250 Connections

4.10.1 Connection to SmartAntenna

Via Bluetooth step-by-step

Step	Description
1.	Select **Main Menu: Config...\Interfaces...** in the Leica software.
2.	Highlight **SmartAntenna**.
3.	**EDIT (F3)**
4.	**CONFIGURE SmartAntenna Interface** **<Use Device: Yes>** Select a free Bluetooth port.
5.	**DEVCE (F5)**
6.	**CONFIGURE Devices** Highlight **ATX1230**.
7.	**CONT (F1)**
8.	**SRCH (F4)** to search for Bluetooth devices.
☞	SmartAntenna must be turned on.

Step	Description
9.	**CONFIGURE Search Bluetooth Device**
	All available Bluetooth devices are displayed.
10.	Highlight the SmartAntenna to be used.
11.	**CONT (F1)**
☞	If the SmartAntenna selected is connected for the first time, a Windows CE authentication request comes up. Type in 0000 as identification number for Leica's Bluetooth and click **OK**.
☞	Once the Bluetooth connection is established, the Bluetooth LED on the SmartAntenna starts flashing in blue.

4.10.2   Connection to a Digital Cellular Phone

Via Bluetooth step-by-step

Step	Description
1.	Select **Main Menu: Config...\Interfaces...** in the Leica software.
2.	Highlight **Real-Time**.
3.	**EDIT (F3)**
4.	**CONFIGURE Real-Time Mode** **<R-Time Mode: Rover>** or **<R-Time Mode: Reference>** Select a free Bluetooth port.
5.	**DEVCE (F5)**
6.	**CONFIGURE Devices**, **Modems/GSM** page Highlight a Bluetooth capable digital cellular phone.
7.	**CONT (F1)**
8.	**SRCH (F4)** to search for the digital cellular phone.
☞	The digital cellular phone must be turned on and Bluetooth must be activated.
9.	**CONFIGURE Search Bluetooth Device**

Step	Description
	All available Bluetooth devices are displayed.
10.	Highlight the digital cellular phone to be used.
11.	**CONT (F1)**
☞	If the digital cellular phone selected is connected for the first time, the Windows CE dialog for pairing comes up. Type in 0000 as identification number for Leica's Bluetooth and click **OK**.
☞	Some digital cellular phones also ask for the identification number for Leica's Bluetooth. The number is 0000.
☞	Some digital cellular phones also ask for an acknowledgement before connecting to another Bluetooth device.

4.10.3 Connection to a Personal Computer

ActiveSync

Microsoft ActiveSync is the synchronization software for Windows mobile-based pocket PC's. ActiveSync enables a PC and a Windows mobile-based pocket PC, like the RX1250, to communicate.
ActiveSync is freeware. It can be downloaded from the Microsoft website.

Connect USB cable to PC for the first time step-by-step

Step	Description
1.	Start the PC.
2.	Have the GPS1200 firmware CD version 4.0 or higher ready.
3.	Plug the GEV161 cable into RX1250.
4.	Turn the RX1250 on.
5.	Wait until the Windows CE desktop is visible.
6.	Plug the GEV161 cable into the USB port of the PC.
☞	The new hardware wizard starts up automatically.
7.	Tick **No, not at this time**.
8.	**Next>**.
9.	Tick **Install from a list or specific location (Advanced)**.

Step	Description
10.	**Next>**.
11.	Insert the GPS1200 firmware CD version 4.0 or higher.
12.	Tick **Search removable media (floppy, CD-ROM...)**.
13.	**Next>**.
14.	Confirm Hardware Installation window with **Continue Anyway**.
15.	**Finish**.
16.	Run the ActiveSync installation program if not already installed.
17.	Allow USB connections inside the **Connection Settings** window of ActiveSync.
18.	Is LGO used?
	If **yes**, continue with step 6. in paragraph "Connect to LGO via USB cable step-by-step".
	Is **no**, continue with step 6. in paragraph "Connect to PC via USB cable step-by-step".

Connect to LGO via USB cable step-by-step

Step	Description
1.	Start the PC.
2.	Plug the GEV161 cable into RX1250.
3.	Turn the RX1250 on.
4.	Plug the GEV161 cable into the USB port of the PC.
☞	ActiveSync starts up automatically. If does not start automatically, start ActiveSync. If not already installed, run the ActiveSync installation program.
5.	Allow USB connections inside the **Connection Settings** window of ActiveSync.
6.	Start LGO or install it if not available.
7.	Start the Leica SmartRover software on the RX1250.
8.	Goto Data Exchange Manager in LGO.
9.	Click **Refresh** on the ActiveSync folder.
10.	Establish the communication to RX1250.
☞	The folders CF-Card, System1200 and Sensor System are displayed in the Data Exchange Manager.

Connect to PC via USB cable step-by-step

Step	Description
1.	Start the PC.
2.	Plug the GEV161 cable into RX1250.
3.	Turn the RX1250 on.
4.	Plug the GEV161 cable into the USB port of the PC.
☞	ActiveSync starts up automatically. If does not start automatically, start ActiveSync. If not already installed, run the ActiveSync installation program.
5.	Allow USB connections inside the **Connection Settings** window of ActiveSync.
6.	Click on **Explore** in ActiveySync.
☞	The folders on the RX1250 are displayed under **Mobile Devices**. The folders of the CompactFlash can be found in **StorageCard**.

Via Bluetooth step-by-step

Step	Description
1.	Activate Bluetooth on the PC.
	The steps required depend on the Bluetooth driver and other PC specific configurations. On the PC, always ensure that
	• the correct COM port is defined.
	• the COM port is configured as incoming, which allows Bluetooth devices to detect the PC.
2.	Turn the RX1250 on.
3.	Go to **Start/Settings/Control Panel/Bluetooth Device**.
4.	Click **Scan Device**.
5.	Highlight the service required in the **Untrusted** box.
6.	Click **- ->** to move the service to the **Trusted** box.
7.	Highlight the service required in the **Trusted** box.
8.	Right mouse click to access the context menu.
9.	Tick **Active**.
☞	Go to **Start/Settings/Control/System/Device Name** to give the RX1250 a specific name.

Step	Description
10.	Go to **Start/Settings/Control Panel/PC Connection**.
11.	Select **Bluetooth** from the combo box.
12.	Go to **Start/Programs/Communication/ActiveSync** to initialise the communication.
☞	As soon as the communication is initialised on the RX1250, ActiveSync establishes the link between the PC and RX1250.
13.	Start LGO or install it if not available.
14.	Goto Data Exchange Manager in LGO.
15.	Click **Refresh** on the ActiveSync folder.
16.	Establish the communication to RX1250.
☞	The folders CF-Card, System1200 and Sensor System are displayed in the Data Exchange Manager.

4.11 Working with the TPS Instrument

4.11.1 Working in Remote Mode

Description

In the remote mode TPS1200 is controlled from RX1220. To work in this mode TPS1200 must be set to RCS mode. Refer to "TPS1200 Technical Reference Manual" for more information. While in RCS mode TPS1200 can still be controlled with the keys on the instrument.

Access step-by-step

Step	Description
☞	Proceed to the local menu of RX1200.
1.	Select **RX1200:** **Main Configuration Menu: Radio/Comms Settings, Modes** page.
2.	Set **<ComMode: RCS Mode>**.
☞	**<ComMode: RCS Mode>** is set automatically when turning on RX1220.

4.11.2   Working in Transparent Mode

Description   **<ComMode: Transparent>** enables the remote control of TPS1200 with GeoCOM commands. RX1220 becomes a transparent radio modem, like the RadioHandle or TCPS27B. GeoCOM commands can be sent from a computer to RX1220, which are then sent to TPS1200 via RadioHandle or TCPS27B. These commands will be executed on TPS1200 and results can be sent back.

Access step-by-step

Step	Description
☞	From **CONFIGURE Interfaces** on TPS1200 ensure that GeoCOM Mode is turned on and RCS Mode is turned off.
☞	Proceed to the local menu of RX1200.
1.	Select **RX1200:** **Main Configuration Menu: Radio/Comms Settings, Modes** page.
2.	Set **<ComMode: Transparent>**.

4.11.3   Working in Semi-Transparent Mode

Description   **<ComMode: Semi-Transparent>** enables the total remote control of TPS1200 in RCS mode but the data being captured by TPS1200 will be sent via radio link to the LEMO port of RX1200. A computer connected to this port will receive the data captured on TPS1200 in real-time.

☞   Data being sent over the radio link in this mode is not protected by a Leica protocol. There exists a chance of data loss without notification.

**Access
step-by-step**

Step	Description
☞	From **CONFIGURE Interfaces** on TPS1200 ensure that GSI Output and RCS Mode are turned on.
☞	Proceed to the local menu of RX1200.
1.	Select **RX1200:
Main Configuration Menu: Radio/Comms Settings, Modes** page.
2.	Set **<ComMode: Semi-Transparent>**.

5 Local Mode

5.1 Accessing the Main Configuration Menu

☞ This option is available for RX1250 in terminal mode.

Access Press **USER** for 2 s.

OR

Automatically after 10 s when no sensor can be detected.

RX1200 A message is displayed for a period of 10 s.

Next step

IF RX1200	THEN
is to be configured	**CONF (F2)** leads directly to **RX1200 Main Configuration Menu**.
is to be connected automatically	**AUTO (F3)** initiates the auto detect function. RX1200 tries to connect to any available instrument or receiver.

IF RX1200	THEN
is to be connected to TPS	**TPS (F4)** tries to connect to any available TPS instrument.
is to be connected to GPS	**GPS (F5)** tries to connect to any available GPS receiver.

5.2 Overview of the Main Configuration Menu

RX1200
Main
Configuration
Menu

Description of main menu functions

Main menu function	Description	Refer to chapter
Choose Sensor	Select the sensor to be working with RX1200.	5.3
Local Settings	Change or adjust the display and sound settings of RX1200.	5.4
Radio/Comms Settings	Change or adjust the communication settings of RX1200.	5.5
Work with Sensor	Leave the Local Mode and work with the selected sensor.	5.6

Next step
CONT (F1) selects the highlighted option and continues with the next screen.

5.3   Choosing a Sensor

**Access
step-by-step**

Step	Description
1.	Refer to "5.1 Accessing the Main Configuration Menu" to access **RX1200 Main Configuration Menu**.
2.	**RX1200 Main Configuration Menu** Highlight **Choose Sensor**.
3.	**CONT (F1)**.

**RX1200
Choose Sensor**

Description of fields

Field	Option	Description
Sensor	**TPS1200**	Sets RX1200 to work with TPS1200. Choose this option if working only TPS1200.
	GPS1200	Sets RX1200 to work with GPS1200. Choose this option if working only GPS1200.
	Auto Detect	Sets RX1200 to try and connect with any connected instrument when starting up. This is the default setting.

Next step
CONT (F1) to return to **RX1200 Main Configuration Menu**.

5.4 Local Settings

Description

The settings on this screen allow the screen appearance to be configured, turn the notification beeps on and off and define the behaviour of the keys. The settings are stored on RX1200 itself.

Access step-by-step

Step	Description
1.	Refer to "5.1 Accessing the Main Configuration Menu" to access **RX1200 Main Configuration Menu**.
2.	**RX1200 Main Configuration Menu** Highlight **Local Settings**.
3.	**CONT (F1)**.

RX1200 Local Settings, Display page

Description of fields

Field	Option	Description
<Touch Screen:>	**On** or **Off**	Turns touch screen on and off.
<Screen Beep:>	**Off**, **Soft** or **Loud**	Controls the beep upon touching the touch screen.

Field	Option	Description
<Screen Illum:>	**Off**, **Always On**, **On for 30 s**, **On for 1 min**, **On for 2 min** or **On for 5 min**	Controls the screen illumination to be on, off or on for the specified time after the last key was pressed or touch screen event.
<Key Illum:>	**Off**, **Always On**, or **Same as Screen**	Controls the keyboard illumination.
<Contrast:>	From **0%** to **100%**	Adjust the contrast level for the display using the arrow keys or using the stylus on the slider.
<Heating:>	**Off**	The screen heating never comes on.
	Automatic	The screen heating comes on automatically at 5°C and below and shuts off again at 7°C.

Next step

IF	THEN
the local settings are to be exited	**CONT (F1)** accepts changes and returns to the screen from where this screen was accessed.
the touch screen is to be calibrated	**CALIB (F5)** calibrates the touch screen.
the next page is to be accessed	**PAGE (F6)** changes to another page on this screen

**RX1200
Local Settings,
Beeps page**

Description of fields

Field	Option	Description
<Warning Beeps:>	**Off**, **Soft** or **Loud**	Controls the beep for acoustic warning signals.
<Key Beeps:>	**Off**, **Soft** or **Loud**	Controls the beep upon key presses on RX1200.

Next step
PAGE (F6) changes to the **More** page.

**RX1200
Local Settings,
More page**

Description of fields

Field	Option	Description
<Language:>	Choicelist	Allows the local mode functions to be displayed in different languages. The language setting does not affect the language displayed when working with a sensor. When working with a sensor, the language selected in the sensor is shown on RX1200.
<Action:>	**None**	RX1200 does not switch off automatically.
	RX Off	After the preset time of RX1200 inactivity, RX1200 switches off.
	RX+TPS Off	After the preset time of RX1200 inactivity, both RX1200 and TPS1200 switch off.
<After time:>	From **1** to **99** minutes	Time of RX1200 inactivity before the set action is executed.

Next step
CONT (F1) to return to the screen from where this screen was accessed.

5.5 Radio Settings

5.5.1 Radio Communication Settings

Description

Allows changes to the communication parameters of RX1200. This screen is more relevant to RX1220. For RX1210, this screen is relevant when combined with TCPS27R.

Access step-by-step

Step	Description
1.	Refer to "5.1 Accessing the Main Configuration Menu" to access **RX1200 Main Configuration Menu**
2.	**RX1200 Main Configuration Menu** Highlight **Radio/Comms Settings**.
3.	**CONT (F1)**.

RX1200 Radio/Comms Settings, Modes page

Description of fields

Field	Option	Description
<ComMode:>	**RCS Mode**	RX1200 operates as a secondary control unit for TPS1200.This is the default setting of RX1200.

Field	Option	Description
	Transparent	Deactivates the software functionality of RX1220, converting it into a radio modem which can be used with RadioHandle or TCPS27B to communicate remotely with TPS1200. Refer to "4.11.2 Working in Transparent Mode" for more information.
	Semi-Transparent	Enables measurement data to be sent from TPS1200, via the radio link, to the LEMO port of RX1200 in real-time. RX1200 continues to control TPS1200 in the normal RCS way. Refer to "4.11.3 Working in Semi-Transparent Mode" for more information.
<Modem:>	Output	Communication internally via the radio modem or externally via the LEMO port.
<Baud Rate:>	From **19200** to **115200**	This field is only available when: **<ComMode: Transparent>** or **<ComMode: Semi-Transparent>**.

Next step

IF	THEN
the local settings are to be exited	**CONT (F1)** accepts changes and returns to the screen from where this screen was accessed.
the next page is to be accessed	**PAGE (F6)** changes to another page on this screen

RX1200 Radio/Comms Settings, Param page

Description of fields

Field	Option	Description
<Link Number:>	From **0** to **15**	Assigned channel number enabling multiple pairs of radios to work simultaneously in the same area without interfering with each other.The link number for RadioHandle or TCPS27 and RX1220 must be the same.
<Baud Rate:>	Output	Frequency of data transfer from instrument to device.
<Parity:>	Output	Error checksum at the end of a block of digital data.

Field	Option	Description
<Terminator:>	Output	The terminator of a data packet.
<Data Bits:>	Output	Number of bits in a block of digital data.
<Stop Bits:>	Output	Number of bits to end a block of digital data.
<Set as:>	**Remote**	Sets the internal radio into a remote mode. The radio modules inside RadioHandle or TCPS27 and RX1220 must be set to opposite settings. It is recommended to set RX1220 to remote and TCPS27 to base.
	Base	Sets the internal radio into a base mode

Next step

IF	THEN
the local settings are to be exited	**CONT (F1)** accepts changes and returns to the screen from where this screen was accessed.
default values are to be restored	**DEFLT (F3)** restores Leica default values to the internal modem of RX1220.

IF	THEN
radio settings are to be edited	**EXT R (F4)** displays and allows editing of TCPS27 external radio settings when connected to the LEMO port.
radio settings are to be synchronised	**SYNC (F5)** synchronises the settings between the internal radio of RX1220 and external radio TCPS27B when connected to each other via cable. ☞ Open **RX1200 Radio/Comms Settings, Param** page to change the parameters for the communication between **RX1220** and **TCPS27**.
the next page is to be accessed	**PAGE (F6)** changes to another page on this screen

5.5.2   Configuring the Radios

Description

RX1200 allows the configuration of
- it's internal radio RX1220.
- the external radio TCPS27.
- the simultaneous synchronisation of both radios.

**View/edit
internal/external
radio settings
step-by-step**

Step	Description
1.	Open **RX1200 Radio/Comms Settings, Param** page.
2.	• For RX1220 the internal radio settings are displayed. • For RX1210 the external radio settings are displayed.
☞	**DEFLT (F3)** to reset to Leica default values
3.	Edit settings.
☞	**EXT R (F4)** to view the external radio settings when TCPS27 is connected to RX1220.
4.	**CONT (F1)** to exit and accept changes.
5.	**ESC** to exit and disregard changes.

Synchronising radio settings for RX1220 step-by-step

Step	Description
1.	Connect TCPS27 to RX1220 with a Y-cable and external battery.
2.	Open **RX1200 Radio/Comms Settings, Param** page.
3.	**SYNC (F5)**.
4.	Open **RX1200 Radio/Comms Settings, Param** page.
5.	The settings of the internal radio of RX1220 are displayed.
6.	Edit settings.

5.6   Working with a Sensor

Description

This function allows to leave the **RX1200 Main Configuration Menu** and returns to working with the sensor.

Exit Configuring RX1200 step-by-step

Step	Description
1.	From any screen in the local mode press **SHIFT QUIT (F6)**.
	OR
	ESC until **RX1200 Main Configuration Menu** is displayed.
2.	**RX1200 Main Configuration Menu**
	Highlight **Work with Sensor**.
3.	**CONT (F1)**.

6   Care and Transport

6.1   Transport

Transport in a road vehicle   Never carry the product loose in a road vehicle, as it can be affected by shock and vibration. Always carry the product in its transport container and secure it.

Shipping   When transporting the product by rail, air or sea, always use the complete original Leica Geosystems packaging, transport container and cardboard box, or its equivalent, to protect against shock and vibration.

Shipping, transport of batteries   When transporting or shipping batteries, the person in charge of the product must ensure that the applicable national and international rules and regulations are observed. Before transportation or shipping, contact your local passenger or freight transport company.

6.2   Storage

Product   Respect the temperature limits when storing the equipment, particularly in summer
                          if the equipment is inside a vehicle. Refer to "9 Technical Data" for information about
                          temperature limits.

Li-Ion batteries   •   Refer to "9 Technical Data" for information about storage temperature range.

                          •   A storage temperature range of -20 to +30°C/-4 to 68°F in a dry environment is
                               recommended to minimise self-discharging of the battery.

                          •   At the recommended storage temperature range, batteries containing a 10% to
                               50% charge can be stored for up to one year. After this storage period the
                               batteries must be recharged.

                          •   Remove batteries from the product and the charger before storing.

                          •   After storage recharge batteries before using.

                          •   Protect batteries from damp and wetness. Wet or damp batteries must be dried
                               before storing or use.

6.3 Cleaning and Drying

Product

Use only a clean, soft, lint-free cloth for cleaning. If necessary, moisten the cloth with water or pure alcohol. Do not use other liquids; these may attack the polymer components.

Damp products

Dry the product, the transport container, the foam inserts and the accessories at a temperature not greater than 40°C / 108°F and clean them. Do not repack until everything is completely dry.

Cables and plugs

Keep plugs clean and dry. Blow away any dirt lodged in the plugs of the connecting cables.

7 Safety Directions

7.1 General Introduction

Description

The following directions should enable the person responsible for the product, and the person who actually uses the equipment, to anticipate and avoid operational hazards.

The person responsible for the product must ensure that all users understand these directions and adhere to them.

7.2   Intended Use

Permitted use
- Remote control of surveying products.
- Data transmission to external appliances.
- Transmitting and receiving data.

Adverse use
- Use of the product without instruction.
- Use outside of the intended limits.
- Disabling safety systems.
- Removal of hazard notices.
- Opening the product using tools, for example screwdriver, unless this is specifically permitted for certain functions.
- Modification or conversion of the product.
- Use after misappropriation.
- Use of products with obviously recognizable damages or defects.
- Use with accessories from other manufacturers without the prior explicit approval of Leica Geosystems.
- Inadequate safeguards at the surveying site, for example when measuring on roads.

• Controlling of machines, moving objects or similar monitoring application without additional control- and safety installations.

⚠ **Warning**   Adverse use can lead to injury, malfunction and damage.
It is the task of the person responsible for the equipment to inform the user about hazards and how to counteract them. The product is not to be operated until the user has been instructed on how to work with it.

7.3 Limits of Use

Environment   Suitable for use in an atmosphere appropriate for permanent human habitation: not suitable for use in aggressive or explosive environments.

⚠ **Danger**   Local safety authorities and safety experts must be contacted before working in hazardous areas, or in close proximity to electrical installations or similar situations by the person in charge of the product.

7.4   Responsibilities

Manufacturer of the product

Leica Geosystems AG, CH-9435 Heerbrugg, hereinafter referred to as Leica Geosystems, is responsible for supplying the product, including the user manual and original accessories, in a completely safe condition.

Manufacturers of non Leica Geosystems accessories

The manufacturers of non Leica Geosystems accessories for the product are responsible for developing, implementing and communicating safety concepts for their products, and are also responsible for the effectiveness of those safety concepts in combination with the Leica Geosystems product.

Person in charge of the product

The person in charge of the product has the following duties:
• To understand the safety instructions on the product and the instructions in the user manual.
• To be familiar with local regulations relating to safety and accident prevention.
• To inform Leica Geosystems immediately if the product and the application becomes unsafe.
• To ensure that the national laws, regulations and conditions for the operation of radio transmitters are respected. Not applicable for RX1210.

⚠️ **Warning**   The person responsible for the product must ensure that it is used in accordance with the instructions. This person is also accountable for the training and the deployment of personnel who use the product and for the safety of the equipment in use.

7.5 International Warranty, Software Licence Agreement

International Warranty

The International Warranty can be downloaded from the Leica Geosystems home page at http://www.leica-geosystems.com/internationalwarranty or received from your Leica Geosystems dealer.

Software Licence Agreement

This product contains software that is preinstalled on the product, or that is supplied to you on a data carrier medium, or that can be downloaded by you online pursuant to prior authorization from Leica Geosystems. Such software is protected by copyright and other laws and its use is defined and regulated by the Leica Geosystems Software Licence Agreement, which covers aspects such as, but not limited to, Scope of the Licence, Warranty, Intellectual Property Rights, Limitation of Liability, Exclusion of other Assurances, Governing Law and Place of Jurisdiction. Please make sure, that at any time you fully comply with the terms and conditions of the Leica Geosystems Software Licence Agreement.

Such agreement is provided together with all products and can also be found at the Leica Geosystems home page at http://www.leica-geosystems.com/swlicense or your Leica Geosystems dealer.

You must not install or use the software unless you have read and accepted the terms and conditions of the Leica Geosystems Software Licence Agreement. Instal-

lation or use of the software or any part thereof, is deemed to be an acceptance of all the terms and conditions of such licence agreement. If you do not agree to all or some of the terms of such licence agreement, you may not download, install or use the software and you must return the unused software together with its accompanying documentation and the purchase receipt to the dealer from whom you purchased the product within ten (10) days of purchase to obtain a full refund of the purchase price.

7.6 End User Licence Agreement EULA

EULA terms

- You have acquired a device RX1250 that includes software licenced by Leica Geosystems from an affiliate of Microsoft Corporation ("MS"). Those installed software products of MS origin, as well as associated media, printed materials, and "online" or electronic documentation ("SOFTWARE") are protected by international intellectual property laws and treaties. The SOFTWARE is licenced, not sold. All rights reserved.

- IF YOU DO NOT AGREE TO THIS END USER LICENCE AGREEMENT ("EULA"), DO NOT USE THE DEVICE OR COPY THE SOFTWARE, INSTEAD, PROMPTLY CONTACT Leica Geosystems FOR INSTRUCTIONS ON RETURN OF THE UNUSED DEVICE(S) FOR A REFUND. **ANY USE OF THE SOFTWARE, INCLUDING BUT NOT LIMITED TO USE ON THE DEVICE, WILL CONSTITUTE YOUR AGREEMENT TO THIS EULA (OR RATIFICATION OF ANY PREVIOUS CONSENT).**

- **GRANT OF SOFTWARE LICENCE**. This EULA grants you the following licence:

  - You may use the SOFTWARE only on the DEVICE.

  - **NOT FAULT TOLERANT**. THE SOFTWARE IS NOT FAULT TOLERANT. Leica Geosystems HAS INDEPENDENTLY DETERMINED HOW TO USE THE SOFTWARE IN THE DEVICE, AND MS HAS RELIED UPON Leica

Geosystems TO CONDUCT SUFFICIENT TESTING TO DETERMINE THAT THE SOFTWARE IS SUITABLE FOR SUCH USE.

- **NO WARRANTIES FOR THE SOFTWARE**. THE SOFTWARE is provided "AS IS" and with all faults. THE ENTIRE RISK AS TO SATISFACTORY QUALITY, PERFORMNCE, ACCURACY, AND EFFORT (INCLUDING LACK OF NEGLIGENCE) IS WITH YOU. ALSO, THERE IS NO WARRANTY AGAINST INTERFERENCE WITH YOUR ENJOYMENT OF THE SOFT-WARE OF AGAINST INFRINGEMENT. **IF YOU HAVE RECEIVED ANY WARRANTIES REGARDING THE DEVICE OR THE SOFTWARE, THOSE WARRANTIES DO NOT ORIGINATE FROM, AND ARE NOT BINDING ON, MS.**

- No Liability for Certain Damages. **EXCEPT AS PROHIBITED BY LAW, MS SHALL HAVE NO LIABILITY FOR ANY INDIRECT, SPECIAL, CONSE-QUENTIAL OR INCIDENTAL DAMAGES ARISING FROM OR IN CONNEC-TION WITH THE USE OR PERFORMANCE OF THE SOFTWARE. THIS LIMITATION SHALL APPLY EVEN IF ANY REMEDY FAILS FOF ITS ESSENTIAL PURPOSE. IN NO EVENT SHALL MS BE LIABLE FOR ANY AMOUNT IN EXCESS OF U.S. TWO HUNDRED FIFTY DOLLARS (U.S.$250.00).**

- **Limitations on Reverse Engineering, Decompilation, and Disassembly.** You may not reverse engineer, decompile, or disassemble the SOFTWARE,

except and only to the extent that such activity is expressly permitted by applicable law notwithstanding thes limitation.

- **SOFTWARE TRANSFER ALLOWED BUT WITH RESTRICTIONS.** You may permanently transfer rights under this EULA only as part of a permanent sale or transfer of the Device, and only if the recipient agrees to this EULA. If the SOFTWARE is an upgrade, any transfer must also include all prior versions of the SOFTWARE.

- **EXPORT RESTRICTIONS.** You acknowledge that SOFTWARE is subject to U.S. and European Union export jurisdiction. You agree to comply with all applicable international and national laws that apply to the SOFTWARE, including the U.S. Export Administration Regulations, as well as end-user, end-use and destination restrictions issued by U.S. and other governments. For additional information see http://www.microsoft.com/exporting/.

7.7 Hazards of Use

⚠ **Warning**　　The absence of instruction, or the inadequate imparting of instruction, can lead to incorrect or adverse use, and can give rise to accidents with far-reaching human, material, financial and environmental consequences.
Precautions:
All users must follow the safety directions given by the manufacturer and the directions of the person responsible for the product.

⚠ **Danger**　　Because of the risk of electrocution, it is very dangerous to use poles and extensions in the vicinity of electrical installations such as power cables or electrical railways.
Precautions:
Keep at a safe distance from electrical installations. If it is essential to work in this environment, first contact the safety authorities responsible for the electrical installations and follow their instructions.

⚠️ **Warning**   By surveying during a thunderstorm you are at risk from lightning.
                       Precautions:
                       Do not carry out field surveys during thunderstorms.

⚠️ **Warning**   During dynamic applications, for example stakeout procedures there is a danger of
                       accidents occurring if the user does not pay attention to the environmental conditions
                       around, for example obstacles, excavations or traffic.
                       Precautions:
                       The person responsible for the product must make all users fully aware of the
                       existing dangers.

⚠️ **Warning**   Inadequate securing of the surveying site can lead to dangerous situations, for
                       example in traffic, on building sites, and at industrial installations.
                       Precautions:
                       Always ensure that the survey site is adequately secured. Adhere to the regulations
                       governing safety and accident prevention and road traffic.

⚠️ **Caution**   With the remote control on surveying products, it is possible that extraneous targets
                       will be picked out and measured.
                       Precautions:
                       When measuring in remote control mode, always check your results for plausibility.

⚠ **Warning**	Only Leica Geosystems authorized service workshops are entitled to repair these products.
⚠ **Warning**	If computers intended for use indoors are used in the field there is a danger of electric shock. **Precautions:** Adhere to the instructions given by the computer manufacturer with regard to field use in conjunction with Leica Geosystems products.
⚠ **Caution**	If the accessories used with the product are not properly secured and the product is subjected to mechanical shock, for example blows or falling, the product may be damaged or people may sustain injury. **Precautions:** When setting-up the product, make sure that the accessories, for example tripod, tribrach, connecting cables, are correctly adapted, fitted, secured, and locked in position. Avoid subjecting the product to mechanical stress.

⚠ **Caution**   During the transport, shipping or disposal of batteries it is possible for inappropriate mechanical influences to constitute a fire hazard.

Precautions:

Before shipping the product or disposing of it, discharge the batteries by running the product until they are flat.

When transporting or shipping batteries, the person in charge of the product must ensure that the applicable national and international rules and regulations are observed. Before transportation or shipping contact your local passenger or freight transport company.

⚠ **Warning**   Using a battery charger not recommended by Leica Geosystems can destroy the batteries. This can cause fire or explosions.

Precautions:

Only use chargers recommended by Leica Geosystems to charge the batteries.

⚠ **Warning**   High mechanical stress, high ambient temperatures or immersion into fluids can cause leackage, fire or explosions of the batteries.

Precautions:

Protect the batteries from mechanical influences and high ambient temperatures. Do not drop or immerse batteries into fluids.

⚠ **Warning**   Short circuited battery terminals can overheat and cause injury or fire, for example by storing or transporting in pockets if battery terminals come in contact with jewellery, keys, metallized paper or other metals.

Precautions:

Make sure that the battery terminals do not come into contact with metallic objects.

⚠ **Warning**   If the product is improperly disposed of, the following can happen:

- If polymer parts are burnt, poisonous gases are produced which may impair health.
- If batteries are damaged or are heated strongly, they can explode and cause poisoning, burning, corrosion or environmental contamination.
- By disposing of the product irresponsibly you may enable unauthorized persons to use it in contravention of the regulations, exposing themselves and third parties to the risk of severe injury and rendering the environment liable to contamination.

Precautions:

The product must not be disposed with household waste.
Dispose of the product appropriately in accordance with the national regulations in force in your country.
Always prevent access to the product by unauthorized personnel.

Product specific treatment and waste management information can be downloaded from the Leica Geosystems home page at http://www.leica-geosystems.com/treatment or received from your Leica Geosystems dealer.

7.8 Electromagnetic Compatibility EMC

Description

The term Electromagnetic Compatability is taken to mean the capability of the product to function smoothly in an environment where electromagnetic radiation and electrostatic discharges are present, and without causing electromagnetic disturbances to other equipment.

⚠ **Warning**

Electromagnetic radiation can cause disturbances in other equipment.

Although the product meets the strict regulations and standards which are in force in this respect, Leica Geosystems cannot completely exclude the possibility that other equipment may be disturbed.

⚠ **Caution**

There is a risk that disturbances may be caused in other equipment if the product is used in conjunction with accessories from other manufacturers, for example field computers, personal computers, two-way radios, non-standard cables or external batteries.

Precautions:

Use only the equipment and accessories recommended by Leica Geosystems. When combined with the product, they meet the strict requirements stipulated by the guidelines and standards. When using computers and two-way radio, pay attention to the information about electromagnetic compatibility provided by the manufacturer.

⚠ **Caution**

Disturbances caused by electromagnetic radiation can result in erroneous measurements.

Although the product meets the strict regulations and standards which are in force in this respect, Leica Geosystems cannot completely exclude the possibility that the product may be disturbed by very intense electromagnetic radiation, for example, near radio transmitters, two-way radios or diesel generators.

Precautions:

Check the plausibility of results obtained under these conditions.

⚠ **Warning**

If the product is operated with connecting cables attached at only one of their two ends, for example external supply cables, interface cables, the permitted level of electromagnetic radiation may be exceeded and the correct functioning of other products may be impaired.

Precautions:

While the product is in use, connecting cables, for example product to external battery, product to computer, must be connected at both ends.

Radios or digital cellular phones

⚠ Warning

Use of product with radio or digital cellular phone:

Electromagnetic radiation can cause disturbances in other equipment, in installations, in medical devices, for example pacemakers or hearing aids and in aircraft. It can also affect humans and animals.

Precautions:

Although the product meets the strict regulations and standards which are in force in this respect, Leica Geosystems cannot completely exclude the possibility that other equipment may be disturbed or that humans or animals may be affected.

- Do not operate the product in the vicinity of filling stations or chemical installations, or in other areas where an explosion hazard exists.
- Do not operate the product near to medical equipment.
- Do not operate the product in aircraft.
- Do not operate the product for long periods immediately next to your body.

7.9 FCC Statement, Applicable in U.S.

Applicablility

The grayed paragraph below is only applicable for RX1210 products without internal radio.

⚠ **Warning**

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC rules.

These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communication. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

• Reorient or relocate the receiving antenna.

• Increase the separation between the equipment and the receiver.

• Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

• Consult the dealer or an experienced radio/TV technician for help.

| ⚠ **Warning** | Changes or modifications not expressly approved by Leica Geosystems for compliance could void the user's authority to operate the equipment. |

Labelling RX1210
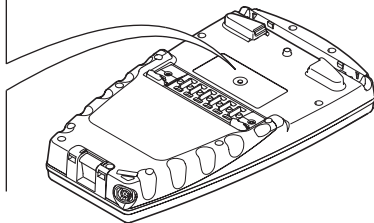

Type: RX1210 ....

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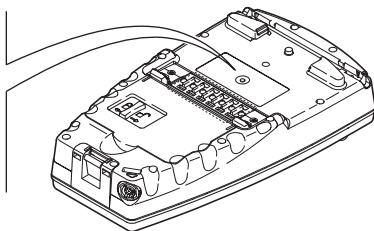. . . . .

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

RX12_023

**Labelling
RX1220**

Type: RX1220

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.
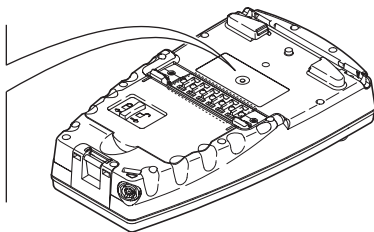
RX12_024

**Labelling
RX1250 X**

Type: RX1250

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

RX12_025

Labelling SmartAntenna

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

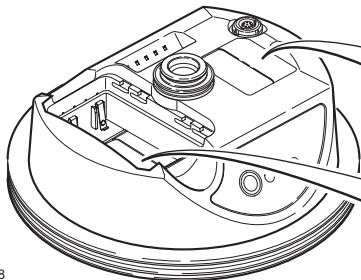Type: AT....   Art.No.: ......
Equip.No.: XXXXXX   S.No.: ......
Power: 12V⎓, nominal 1/0.5A max.
Leica Geosystems AG
CH-9435 Heerbrugg
Manufactured: 2004
Made in Switzerland   S.No.: ......

TPS12_208

**Labelling
GHT56**

Type: GHT 56   ....
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CE

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

RX12_026

Labelling GFU16, GFU17, GFU24

Type: GFUXX . . . .
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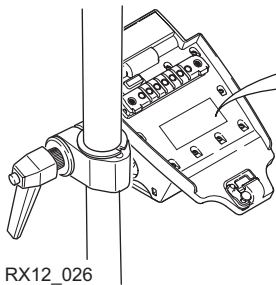*This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired*

GPS12_103

Labelling GFU19, GFU25

Type: GFUXX   . . . .
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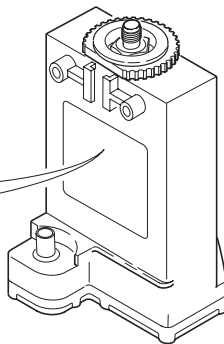. . . . .
. . . .

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

TPS12_218
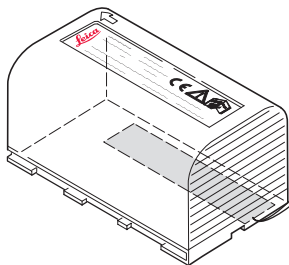
**Labelling
internal battery
GEB211, GEB221**

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

C **(UL)** US LISTED
ITE Accessory
E179078 . 70YL

TPS12_082

Labelling
USB cable GEV161

Type: GEV161   Art.No.: 733281
Power: 3,3V ▬▬ / 0,005mA
Leica Geosystems AG
CH-9435 Heerbrugg   C E
Manufactured: 08.2005
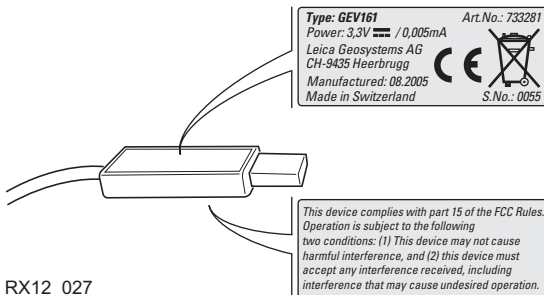Made in Switzerland   S.No.: 0055

This device complies with part 15 of the FCC Rules.
Operation is subject to the following
two conditions: (1) This device may not cause
harmful interference, and (2) this device must
accept any interference received, including
interference that may cause undesired operation.

RX12_027

8 Trouble Shooting

Turning on and communicating with the instruments

Problem	Details	To be checked
RX1200 does not turn on	RX1220 with a battery	• Battery fully charged.
	RX1210	• Clip-on connection to GPS1200.
		• Cable connection to GPS1200 RX1200 port.
		• Connection to a fully charged battery.
RX1200 does not connect to TPS1200	Via the radio link	• **<Sensor: TPS1200>** or **<Sensor: Auto Detect>** is selected in **Main Configuration Menu: Choose Sensor** on the RX1200. Refer to "5.3 Choosing a Sensor".
		• **<ComMode: RCS Mode>** is selected in **Main Configuration Menu: Radio/Comms Settings** on the **Modes** page. Refer to "5.5 Radio Settings".

Problem	Details	To be checked
		• TPS1200 is set to work in RCS mode. Refer to "TPS1200 Technical Reference Manual".
		• The base radio is connected to the instrument and a fully charged external battery.
		• RX1220 and the base radio are within radio range.
		• The radio settings in RX1220 and the base radio are correct. Refer to "5.5 Radio Settings". Radio settings should be synchronised to Leica default values. Refer to paragraph "Synchronising radio settings for RX1220 step-by-step" in "5.5.2 Configuring the Radios".

Problem	Details	To be checked
	Via cable	• **<Sensor: TPS1200>** or **<Sensor: Auto Detect>** is selected in **Main Configuration Menu: Choose Sensor** on the RX1200. Refer to "5.3 Choosing a Sensor". • **<ComMode: RCS Mode>** is selected in **Main Configuration Menu: Radio/Comms Settings** on the **Modes** page. Refer to "5.5 Radio Settings". • Proper physical connection of cable to TPS1200 and RX1220. • RX1210 is connected to the instrument and a fully charged external battery.
RX1200 does not connect to GPS1200	Via clip-on-contacts	• RX1200 is properly connected to GPS1200.

Problem	Details	To be checked
	Via cable	• **<Sensor: GPS1200>** or **<Sensor: Auto Detect>** is selected in **Main Configuration Menu: Choose Sensor** on RX1200. Refer to "5.3 Choosing a Sensor". • RX1200 is properly connected to GPS1200.
		• **<Sensor: GPS1200>** or **<Sensor: Auto Detect>** is selected in **Main Configuration Menu: Choose Sensor** on RX1200. Refer to "5.3 Choosing a Sensor".
RX1250 does not connect to SmartAntenna	Via Bluetooth	• SmartAntenna battery is charged. • SmartAntenna is switched on. • Correct configuration in **CONFIGURE SmartAntenna Interface**.
	Via cable	• Correct cable being used GEV 173, 8 pin Lemo connectors with green shielding.

RX1220 radio performance

Problem	Details	To be checked
Radio range not optimal		• TCPS27B is mounted onto the tripod using the adapter. Refer to "4.1.2 Setting up with the TPS Instrument".
		• Change the link number if it is suspected to have other 2.4 GHz radios operating in the area, this measure may reduce interference and improve radio performance. Refer to "5.5 Radio Settings".
		• RX1220 faces the instrument without obstruction between the antennas.

RX1250 communicating with radio/digital cellular phone

Problem	Details	To be checked
RX1250 does not connect to digital cellular phone	Via Bluetooth	• Bluetooth on digital cellular phone turned on.
		• Digital cellular phone ready for external connectivity.
		• Battery of digital cellular phone fully charged.

Problem	Details	To be checked
RX1250 does not recognise radio	Via GHT56	• RX1250 is properly connected to GHT56 via clip-on-contacts. • Battery of radio fully charged. The radio is powered by the battery attached to GHT56. If the LED indicator on GHT56 is green, then power is okay.

RX1250 recognising Compact-Flash card

Problem	Details	To be checked
RX1250 does not recognise CompactFlash card	CompactFlash card is inserted into a slot inside the battery compartment on the underside of the RX1250.	• CompactFlash card is inserted. • CompactFlash card is pushed in completely.

**RX1250
Windows CE**

Problem	Details	To be checked
📱 not on Windows CE desktop	Icon to display Leica software	• Tap the **Start** button in the bottom left corner of Windows CE desktop. Then select **Programs\Leica Geosystems\GPS1200**. • Access the Windows directory from the Windows CE Explorer. Copy the Leica software icon and paste it to the Windows CE desktop. The Leica software icon may be a hidden file.
Function keys are hidden by Windows CE task bar	-	• Tap the **Start** button in the bottom left corner of Windows CE desktop. Then select **Settings\Taskbar and Start Menu**. Under the **General** tab tick the **Auto hide** option.

RX1250 Bluetooth connection to PC

Problem	Details	To be checked
RX1250 does not connect to PC	Via Bluetooth	• Use another USB port to connect the Bluetooth device to the PC.
		• Is the device properly detected and the driver loaded?
		• Go to **My Computer/Manage/Device Management**. Check the settings of the Bluetooth device.
		• Check the Bluetooth device settings, for example the **Options** and **COM ports** pages.
		• Is ActiveSync running? Is the correct COM port defined in the **Connection Settings** dialog?
		• Re-boot the PC or/and RX1250.

9   Technical Data

9.1   RX1200 Technical Data

Design

Glass reinforced polymer housing with optional integrated battery and radio modem.

Control unit

Display:	1/4 VGA (320 x 240 pixels), monochrome, graphics capable LCD, illumination, optional touch screen
Keyboard:	62 keys including 12 function keys, illumination
Angle Display:	360°'", 360° decimal, 400 gon, 6400 mil, V %
Distance Display:	m, ft int, ft us, ft int inch, ft us inch
Touch screen if fitted:	Toughened film on glass

Dimensions

Type	Length [m]	Width [m]	Thickness [m]
RX1210	0.218	0.123	0.037
RX1220/RX1250	0.218	0.123	0.047

Weight

Type	Weight [kg]/[lbs]
RX1210	0.507/1.118
RX1220 with GEB211	0.753/1.660
RX1250 X with GEB211	0.741/1.634

Recording

For RX1250, data can be recorded on the CompactFlash card.

Type	Capacity [MB]	Data capacity
CompactFlash card	• 64 • 256 • 1024	64 MB is typically sufficient for about GPS only (8 satellites) • 500 h L1 + L2 data logging at 15 s rate • 2000 h L1 + L2 data logging at 60 s rate • 90000 real-time points with codes GPS + GLONASS (8 + 4 satellites) • 340 h data logging at 15 s rate • 1360 h data logging at 60 s rate • 90000 real-time points with codes

Power

Type	Consumption [W]	External supply voltage
RX1210	1	Nominal voltage 12 V DC (⎓) Voltage range 11.5 V-28 V
RX1220	1.3	Nominal voltage 12 V DC (⎓) Voltage range 11.5 V-28 V
RX1250 X	1.1 Bluetooth to SmartAntenna, digital cellular phone powered from GHT56	Nominal voltage 12 V DC (⎓) Voltage range 11.5 V-28 V

Internal battery

Type	Battery	Voltage	Capacity	Operating time, typical
RX1220	Li-Ion	7.4 V	GEB211: 1.9 Ah	10 h
RX1250 X	Li-Ion	7.4 V	GEB211: 1.9 Ah	11 h Bluetooth to SmartAntenna

Environmental specifications

Temperature

Type	Operating temperature [°C]	Storage temperature [°C]
RX1200	-30 to +65 Bluetooth: -25 to +65	-40 to +80
Internal battery	-20 to +50	-40 to +70

Protection against water, dust and sand

Type	Protection
RX1200	IP67 (IEC60529) Dusttight Waterproof to 1 m temporary immersion

Humidity

Type	Protection
RX1200	Up to 100 % The effects of condensation are to be effectively counter-acted by periodically drying out RX1200.

Interfaces

Type	RS232 No handshake	RS232 Handshake	USB	Bluetooth
RX1210/ RX1220	• LEMO port • Clip-on-contacts	-	-	-
RX1250	LEMO port	Clip-on-contacts	LEMO port	Class 2

Data format for RS232

The default values are:

Baud rate:	115200
Parity:	None
Terminator:	CR/LF
Data bits:	8
Stop bits:	1

Ports

Type	8 pin LEMO-1	Special clip-on interface
RX1210/ RX1220	For power and/or communication	For power and communication to GPS1200
RX1250	For power and/or communication	For communication to GHT56 and GPS1200

9.2 SmartAntenna Technical Data

9.2.1 Tracking Characteristics

Receiver technology	SmartTrack+ (ATX1230 GG) SmartTrack (ATX1230)
Satellite reception	Dual frequency

Receiver channels	ATX1230 GG:	14 channels continuous tracking on L1 and L2 (GPS); twelve channels continuous tracking on L1 and L2 (GLONASS); two channels tracking SBAS.
	ATX1230:	Twelve channels continuous tracking on L1 and L2 (GPS); two channels tracking SBAS.

Supported codes **GPS**

Type	L1	L2
ATX1230 GG/ ATX1230	Carrier phase, C/A code	Carrier phase, C code (L2C) and P2 code

GLONASS

Type	L1	L2
ATX1230 GG	Carrier phase, C/A code	Carrier phase, P2 code

Carrier tracking   **GPS**

Condition	ATX1230 GG/ATX1230
L1, AS off or on	Reconstructed carrier phase via C/A code
L2, AS off	Reconstructed carrier phase via P2 code
L2, AS on	Switches automatically to patented P code-aided technique providing full L2 reconstructed carrier phase

GLONASS

Condition	ATX1230 GG
L1	Reconstructed carrier phase via C/A code
L2	Reconstructed carrier phase via P2 code

Code measurements

GPS

Condition	ATX1230 GG/ATX1230
L1, AS off L1, AS on	Carrier phase smoothed code measurements: C/A code
L2, AS off	Carrier phase smoothed code measurements: P2 code
L2, AS on	Carrier phase smoothed code measurements: Patented P code-aided code

GLONASS

Condition	ATX1230 GG
L1	Carrier phase smoothed code measurements: C/A code
L2	Carrier phase smoothed code measurements: P2 code

☞ Carrier phase and code measurements on L1 and L2 are fully independent with AS on or off.

Satellites tracked

ATX1230 GG: Up to 14 simultaneously on L1 and L2 (GPS) + up to twelve simultaneously on L1 and L2 (GLONASS) + up to two SBAS

ATX1230: Up to twelve simultaneously on L1 and L2 + up to two SBAS

9.2.2 Accuracy

☞ Accuracy is dependent upon various factors including the number of satellites tracked, constellation geometry, observation time, ephemeris accuracy, ionospheric disturbance, multipath and resolved ambiguities.

The following accuracies, given as **r**oot **m**ean **s**quare, are based on measurements processed using LGO and on real-time measurements.

Differential code

The baseline precision of a differential code solution for static and kinematic surveys is 25 cm.

Differential phase in post-processing

Normal baselines

Static		Kinematic	
Horizontal	**Vertical**	**Horizontal**	**Vertical**
5 mm + 0.5 ppm	10 mm + 0.5 ppm	10 mm + 1 ppm	20 mm + 1 ppm

Long baselines

Static	
Horizontal	**Vertical**
3 mm + 0.5 ppm	6 mm + 1 ppm

Differential phase in real-time

Static		Kinematic	
Horizontal	**Vertical**	**Horizontal**	**Vertical**
5 mm + 0.5 ppm	10 mm + 0.5 ppm	10 mm + 1 ppm	20 mm + 1 ppm

9.2.3   Technical Data

Description and use

The SmartAntenna is selected for use based upon the application. The table gives a description and the intended use of the SmartAntenna.

Type	Description	Use
ATX1230 GG/ ATX1230	L1/L2 SmartTrack+/SmartTrack antenna with built in ground-plane.	With RX1250 or TPS1200.

Dimensions

Height: 0.890 m
Diameter: 0.186 m

Connector

8 pin LEMO-1

Mounting

5/8" Whitworth

Weight

1.1 kg including internal battery GEB211

| **Power** | Power consumption: | 1.8 W typically, 270 mA |
| | External supply voltage: | Nominal 12 V DC (⎓, GEV197 SmartAntenna to PC for data transfer and to external power supply), voltage range 5-28 V DC |

Battery internal	Type:	Li-Ion
	Voltage:	7.4 V
	Capacity:	GEB211: 1.9 Ah
	Typical operating time:	5 h

Electrical data

Type	**ATX1230 GG**	**ATX1230**
Voltage	-	-
Current	-	-
Frequency	GPS L1 1575.42 MHz	GPS L1 1575.42 MHz
	GPS L2 1227.60 MHz	GPS L2 1227.60 MHz
	GLONASS L1 1602.5625-1611.5 MHz	
	GLONASS L2 1246.4375-1254.3 MHz	

Type	ATX1230 GG	ATX1230
Gain	Typically 27 dBi	Typically 27 dBi
Noise Figure	Typically < 2 dBi	Typically < 2 dBi
BW, -3 dBiW	-	-
BW, -30 dBi	-	-

Environmental specifications

Temperature

Operating temperature [°C]	Storage temperature [°C]
-40 to +65	-40 to +80
Bluetooth: -30 to +65	

Protection against water, dust and sand

Protection
IP67 (IEC 60529)
Dusttight
Protected against water jets

Protection
Waterproof to 1 m temporary immersion

Humidity

Protection
Up to 100 %
The effects of condensation are to be effectively counteracted by periodically drying out the antenna.

9.3 GHT56 Technical Data

Dimensions	Length:	0.169 m
	Width:	0.123 m
	Thickness:	0.130 m

Connector	• 8 pin LEMO-1
	• 7 pin clip-on-contacts

Weight	0.460 kg including internal battery GEB211

Power	Power consumption:	Nominal voltage 7.4 V DC ($=$) / 2.0 A max

Battery	Type:	Li-Ion
	Voltage:	7.4 V
	Capacity:	GEB211: 1.9 Ah, GEB221: 3.8 Ah
	Typical operating time:	The given operating times are valid for
		• one fully charged GEB221 battery.
		• 25°C. Operating times will be shorter when working in cold weather.
		• good data link.

GFU14, receive only mode: 14.5 h
GFU17, GFU24: 6.1 h
Pacific Crest radio, receive only mode: 13.3 h

Environmental specifications

Temperature

Operating temperature [°C]	Storage temperature [°C]
-20°C to +65	-40 to +80

Protection against water, dust and sand

Protection
IP67 (IEC 60529)
Dusttight
Protected against water jets
Waterproof to 1 m temporary immersion

Humidity

Protection
Up to 100 %
The effects of condensation are to be effectively counteracted by periodically drying out the antenna.

9.4 Conformity to National Regulations

9.4.1 RX1220

Conformity to national regulations

- FCC Part 15 (applicable in US)
- Hereby, Leica Geosystems AG, declares that the RX1220 is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC. The declaration of conformity may be consulted at http://www.leica-geosystems.com/ce.

  CE $!$ Class 2 equipment according European Directive 1999/5/EC (R&TTE) for which following EEA Member States apply restrictions on the placing on the market or on the putting into service or require authorization for use:
  - France
  - Italy
  - Norway (if used in the geographical area within a radius of 20km from the centre of Ny-Ålesund)

- The conformity for countries with other national regulations not covered by the FCC part 15 or European directive 1999/5/EC has to be approved prior to use and operation.

Frequency band   Limited to 2409 - 2435 MHz

Ouput power

Type	Output power [mW]
RX1220	< 100 (e. i. r. p.)

Antenna

Type	Antenna	Gain [dBi]	Connector	Frequency band [MHz]
RX1220	Detachable λ/4 antenna	2	SMA	• 2409 - 2435

9.4.2 RX1250

Conformity to national regulations

- FCC Part 15 (applicable in US)
- Hereby, Leica Geosystems AG, declares that the RX1250 is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC. The declaration of conformity may be consulted at http://www.leica-geosystems.com/ce.

  $C\epsilon$ Class 1 equipment according European Directive 1999/5/EC (R&TTE) can be placed on the market and be put into service without restrictions in any EU Member state.
- The conformity for countries with other national regulations not covered by the FCC part 15 or European directive 1999/5/EC has to be approved prior to use and operation.

Frequency band

Type	Frequency band [MHz]
RX1250, Bluetooth	2400 - 2483.5

Ouput power

Type	Output power [mW]
RX1250, Bluetooth	2.5

Antenna

Type	Antenna	Gain [dBi]	Connector	Frequency band [MHz]
RX1250, Bluetooth	Integrated antenna	-	-	-

9.4.3　GFU16, Bluetooth communication

Conformity to national regulations

- FCC Part 15 (applicable in US)
- Hereby, Leica Geosystems AG, declares that the GFU16 is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC. The declaration of conformity may be consulted at http://www.leica-geosystems.com/ce.

$C\mathcal{E}$　$\textcircled{\scriptsize !}$　Class 2 equipment according European Directive 1999/5/EC (R&TTE) for which following EEA Member States apply restrictions on the placing on the market or on the putting into service or require authorization for use:

   - France
   - Italy
   - Norway (if used in the geographical area within a radius of 20km from the centre of Ny-Ålesund)

- The conformity for countries with other national regulations not covered by the FCC part 15 or European directive 1999/5/EC has to be approved prior to use and operation.

Frequency band　2402 - 2480 MHz

Output power　Bluetooth Class 2 type:　2.5 mW

Antenna   Type   Internal patch antenna
                       Gain   2.7 dBi

9.4.4   GFU17, Siemens MC45

Conformity to national regulations

- FCC Part 15 and 24 (applicable in US)
- Hereby, Leica Geosystems AG, declares that the GFU17 is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC. The declaration of conformity may be consulted at http://www.leica-geosystems.com/ce.

$C\epsilon$ Class 1 equipment according European Directive 1999/5/EC (R&TTE) can be placed on the market and be put into service without restrictions in any EU Member state.

- The conformity for countries with other national regulations not covered by the FCC part 15 and 24 or European directive 1999/5/EC has to be approved prior to use and operation.

Frequency band   Tri-Band EGSM900 / GSM1800 / GSM1900 MHz

Output power
EGSM900:	2 W
GSM1800:	1 W
GSM1900:	1 W

Antennas

Type	GAT 3	GAT 5
Frequency band	900 or 1800 MHz	850 or 1900 MHz
Type	Detachable λ/2 antenna	Detachable λ/2 antenna
Gain	0 dBi	0 dBi
Connector	TNC	TNC

Specific Absorption Rate (SAR)

The product meets the limits for the maximum permissible exposure of the guidelines and standards which are force in this respect. The product must be used with the recommended antenna. A separation distance of at least 20 centimeters should be kept between the antenna and the body of the user or nearby person within the intended application.

9.4.5 GFU24, Siemens MC75

Conformity to national regulations

- FCC Part 15, 22 and 24 (applicable in US)
- Hereby, Leica Geosystems AG, declares that the GFU17 is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC. The declaration of conformity may be consulted at http://www.leica-geosystems.com/ce.

$C\epsilon$ Class 1 equipment according European Directive 1999/5/EC (R&TTE) can be placed on the market and be put into service without restrictions in any EU Member state.

- The conformity for countries with other national regulations not covered by the FCC part 15, 22 and 24 or European directive 1999/5/EC has to be approved prior to use and operation.

Frequency band

Quad-Band EGSM850 / EGSM900 / GSM1800 / GSM1900 MHz

Output power

EGSM850:	2 W
EGSM900:	2 W
GSM1800:	1 W
GSM1900:	1 W

Antennas

Type	GAT 3	GAT 5
Frequency band	900 or 1800 MHz	850 or 1900 MHz
Type	Detachable λ/2 antenna	Detachable λ/2 antenna
Gain	0 dBi	0 dBi
Connector	TNC	TNC

Specific Absorption Rate (SAR)

The product meets the limits for the maximum permissible exposure of the guidelines and standards which are force in this respect. The product must be used with the recommended antenna. A separation distance of at least 20 centimeters should be kept between the antenna and the body of the user or nearby person within the intended application.

9.4.6 GFU19 (US), GFU25 (CAN) CDMA MultiTech MTMMC-C

Conformity to national regulations

- FCC Part 15, 22 and 24 (applicable in US)
- The conformity for countries with other national regulations not covered by the FCC part 15, 22 and 24 has to be approved prior to use and operation.

Frequency band

Dual-Band CDMA850/CDMA1900 MHz

Output power

CDMA850:   2 W
CDMA1900:   0.4 W

Antenna

Type	GAT 5
Frequency band	850 or 1900 MHz
Type	Detachable λ/2 antenna
Gain	0 dBi
Connector	TNC

Specific Absorption Rate (SAR)

The product meets the limits for the maximum permissible exposure of the guidelines and standards which are force in this respect. The product must be used with the recommended antenna. A separation distance of at least 20 centimeters should be kept between the antenna and the body of the user or nearby person within the intended application.

9.4.7 SmartAntenna with Bluetooth

Conformity to national regulations

- FCC Part 15 (applicable in US)
- Hereby, Leica Geosystems AG, declares that the SmartAntenna with Bluetooth is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC. The declaration of conformity may be consulted at http://www.leica-geosystems.com/ce.

  $\mathsf{C}\mathsf{E}$ Class 1 equipment according European Directive 1999/5/EC (R&TTE) can be placed on the market and be put into service without restrictions in any EU Member state.

- The conformity for countries with other national regulations not covered by the FCC part 15 or European directive 1999/5/EC has to be approved prior to use and operation.

Frequency band

Type	Frequency band [MHz]
ATX1230 GG/ATX1230	1227.60 1575.42
ATX1230 GG	1246.4375 - 1254.3 1602.4375 - 1611.5
Bluetooth	2402 - 2480

Output power

Type	Output power [mW]
GNSS	Receive only
Bluetooth	5

Antenna

GNSS   Internal GNSS antenna element (receive only)
Bluetooth   Type: Internal Microstrip antenna
                Gain: 1.5 dBi

Appendix A Directory Structure of the Memory Device

Description

On the memory device, files are stored in certain directories. The following diagram of the directory structure refers to both CompactFlash card and internal memory if fitted. Backwards compatible with Leica GPS System 500 are geoid field files, CSCS field files and GSI files.

Directory structure

── CODE	• Codelists, various files
── CONFIG	• GPS configuration files (*.xfg)
── CONVERT	• Format files (*.frt)
── DATA	• ASCII files for import/export to/from job (*.*)
	• Logfiles created from application programs
── GPS	• Almanac file (Almanac.sys)
── CSCS	• CSCS field files (*.csc)

```
|                |—— GEOID        •   Geoid field files (*.gem)
|
|                |—— RINGBUF      •   Ring buffer files
|
|—— DBX                           •   Job files, various files
|                                 •   DTM jobs, various files
|                                 •   System 1200 coordinate system file
|                                     (Trfset.dat)
|—— GPS                           •   Antenna file (List.ant)
|                                 •   GSM/Modem station list
|                                     (Stations1200.fil)
|—— GSI                           •   GSI files (*.gsi)
|                                 •   ASCII files for export from job (*.*)
|—— SYSTEM                        •   Application program files (*.a*)
                                  •   Firmware files (*.fw)
                                  •   Language files (*.s*)
                                  •   Licence file (*.key)
                                  •   System files (System.ram)
```

Appendix B Cables

Description

Some applications require the connection of instruments, devices or accessories to the RX1200. In this chapter, the required cables and their use are listed.

Cables connecting instruments, devices or accessories

The table shows in alphabetical order which instruments, devices or accessories can be connected using cables. Refer to paragraph "Cables and product names" for a full description of these cables.

From	To	Cables
Car battery	RX1210/RX1220	• GEV186 + GEV71
		• GEV188 + GEV71
GEB70 or GEB171	RX1200	• GEV97
		• GEV121
	SmartAntenna	• GEV197 + GEV97
		• GEV197 + GEV121
Power supply for GPS receiver, 12 V DC	SmartAntenna	• GEV197
RS232 9 pin on PC	RX1210/RX1220	• GEV160

From	To	Cables
		• GEV188
	RX1250	• GEV162
	SmartAntenna	• GEV197
RX1200	GPS1200	• GEV163
		• GEV164
	GRX1200 Pro/ GRX1200 GG Pro	• GEV163
		• GEV164
	TPS1200	• GEV185
		• GEV186
RX1210/RX1220	TCPS27	• GEV190
RX1250	SmartAntenna	• GEV173
TCPS27	RX1210/RX1220	• GEV190
USB on PC	RX1250	• GEV161

Cables and product names

The product names of the cables in the above table are explained in detail below in ascending order.

Name	Description
GEV71	Cable 4.0 m, LEMO to 12 V DC power supply It allows a connection to a 12 V DC power supply for example a car battery. Cables used to connect to a GEB70 or GEB171 battery can be connected to adapter cable number 7.
GEV97	Cable 1.8 m, GX power cable
GEV121	Cable 0.5 m, GX power cable
GEV160	Cable 2.8 m, data transfer GX COM to RS232
GEV161	Cable 2.8 m, data transfer GX RX1250 to USB
GEV162	Cable 2.8 m, data transfer GX RX to RS232
GEV163	Cable 1.8 m, RX to GX
GEV164	Cable 1.0 m, RX to GX, all-on-pole setup
GEV173	Cable 1.2 m, SmartAntenna to RX1250
GEV185	Cable 1.8 m, TPS1200 to RX1200
GEV186	Y-cable 1.8 m, RX1210/RX1220/TCPS27 to TPS1200 with power

Name	Description
GEV188	Y-cable 2.0 m, RX1210/RX1220/TCPS27 to RS232 with power
GEV190	Y-cable 1.8 m, RX1210/RX1220 to TCPS27 with power
GEV197	Y-cable 2.8 m, SmartAntenna to PC for data transfer and to power supply

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